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ESSAYS

BY

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PREFACE

It was Mr. Romanes' wish that some of his essays should be collected and republished. The following selection has been made, I trust, with due care, and serves to show the range of his thought and the versatility of his mind. Those who knew him well will doubtless still feel that the man was even greater than his works. His conversation was so suggestive, his personality so genial and loveable, that one cannot but feel how inadequate is the printed page.

Except for the correction of a few obvious misprints the Essays are reprinted as they stand in the pages of the magazines and reviews from which they are by courteous permission extracted.

C. LLOYD MORGAN.

BRISTOL, *October* 1896.

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METCALFE HALL

ESSAYS.

I.

PRIMITIVE NATURAL HISTORY.

THE notions of plants and animals which were entertained in the most primitive stages of human culture may be gathered from two sources—the one indirect, general, and inferential, the other direct, special, and historical. The general character of primitive ideas of natural history before the dawn of the historical period may be inferred with tolerable certainty from the notions which are entertained by savages at the present time. In the most ancient books of the Bible—possibly the oldest, certainly the most interesting, records of early thought—these primitive ideas are exhibited in a literary and historical form. The two sources taken together present the primitive philosophy of natural history, and it is from this standpoint that I propose to examine the notions of plants and animals now held by savages, as well as those which are exhibited in the most ancient books of the Bible.

The notions entertained of plants and animals by existing savages are pretty uniform in different parts of the world. Whether it be owing to a speculative interpretation of their dreams, to an observation of their shadows, or to the worship of their deceased ancestors—who are felt to be in some sense alive because their names are still in use,—it is certain that savages, as a general rule, entertain a belief in the continued existence of their dead. Such existence is supposed to be thus continued in a world of shadows, ghosts, or spirits —a world, however, which is not far removed from that in which the dead had previously lived. Indeed, so far as we are able to interpret the not very clear notions which savages entertain upon the locality and conditions of spirit-life, the locality seems still to be mundane, and the conditions continue to resemble those of corporeal existence as closely as is compatible with the absence of a human body; for the soul or spirit of the deceased man is still supposed to hover around the scenes of his earthly life, and it is usually supposed to be even so far material in its nature as to leave footprints upon sand, to require food and drink, and so forth.

From the idea that human beings are animated by spirits, which during the life of the body fill every part of the body, and therefore in their subsequent or incorporeal existence continue to present in every detail the form of the body—from this idea there arises another, namely, that not only all animals and plants, but likewise all inanimate objects, present a spiritual or shadow-like substratum. The resemblance of this idea to that of the schoolmen is obviously very striking. For the schoolmen distinguished between 'form' and 'substance.' The form was the outward physical body of an object, which admits of being cognized by our senses. The substance was that which *stood under* the form, and, although not cognizable by the senses, constituted the true reality of the object. And it is from this idea that the doctrine of sacrifice takes its origin—a doctrine which afterwards goes to constitute the backbone of all the religions of the world. The slaves who are killed after the decease of their master are killed in order that their spirits may continue to minister to him in the land of spirits; and the food and drink which are provided for his use are supposed to be, as it were, provided spiritually. It is seen that the food and drink do not diminish, but what of that? The spirit eats and drinks the *substance*, if he does not touch the *form*; and this is all that the spirit is supposed to care about. Similarly, also, the weapons which are given to him remain, to every appearance, untouched; but the eye of savage faith can see how the spirit of the dead man is able to use the substance of his weapons in conducting his spiritual warfare or his spiritual hunt. And, if he happens to have been a chief or a hero in the flesh, sacrifices of animals, or often of human victims, follow upon the sacrifices of food and weapons, so that his power over men may be propitiated.

Thus we find that to savage thought the world is more full of human souls than it is of human bodies, and that even inanimate objects are endowed with a kind of spiritual existence, which is an imperceptible copy of their physical existence. Moreover, the fertile and unrestrained imagination of savages peoples its ghostland with numberless spiritual existences of yet other kinds—witches, devils, beast-like shades, and so forth; the whole universe thus becoming a pandemonium.

One of the results, and probably the earliest result, of such a system of belief is fetishism. Material objects are supposed to be the abodes of spiritual beings, or fetishes; all natural forces, such as winds and currents, are supposed to be the expressions of fetish activity. According to Professor Waitz, the following may be taken as the first principles of this philosophy. 'A spirit dwells, or can dwell, in every sensible object, and often a very great and mighty one in an insignificant thing. This spirit he does not consider as bound fast and unchangeably to the corporeal thing it dwells in, but it has there only its usual or principal abode.' The fetish can see and hear all that the savage does in its presence; it is also able to act either for or against his interests. The savage, therefore, does all he can to propitiate his fetish; and, if he thinks that the fetish of any small object is well-disposed towards him, he will wear the object about his person as a charm. Or he may store such objects in a museum, which then becomes the temple of his worship. Romer tells us of an old negro whom he once saw performing his devotions in his private fetish-museum, surrounded by about twenty thousand fetishes; and was told by the old man 'that he did not know the hundredth part of the services they had performed for him.'

Now, seeing that even inanimate objects are thus habitually furnished by savage imagination with living and intelligent spirits, we cannot wonder that the most favourite objects of fetishistic worship among primitive men are those which are most plainly seen to present the phenomena of life. Hence, the philosophy of natural history in its earliest beginning is a philosophy of what may be termed zoolatry, or the worship of life as manifested by plants and animals. Thus, to quote Mr. Tylor, 'first and foremost, uncultured man seems capable of simply worshipping a beast as beast, looking on it as possessed of power, courage, cunning beyond his own, and animated like a man by a soul which continues to exist after bodily death, powerful as ever for good or harm.' In somewhat higher stages of culture, 'this idea may blend with the thought of the creature as being an incarnate deity, seeing, hearing, and acting even at a distance.' On this account all harmful animals, such as whales which overturn canoes, sharks, serpents, wolves, &c., are specially constituted objects of worship. And, as showing the abject contradiction of savage thought, it is curious to note the practice of some races, who, when they have killed an animal for food, ask the pardon of its spirit before they proceed to eat its body.

At a still higher level of culture, when the philosophy of the subject has become somewhat more elaborated, particular species of animals are set apart as objects of special worship, because it is supposed that the members of this species constitute, as it were, the shrines or incarnations of particular or tutelary deities. As a rule, these animals are never slain; and in some cases, as in those of bulls and monkeys in many parts of India, are pampered and petted in the most extravagant fashion. Thus we may say that the earliest attempt at zoological classification by any philosophical theory is the attempt which is made by the grossest superstition.

According to Mr. M'Lennan, Sir John Lubbock, and Mr. Herbert Spencer, the practice of zoolatry may have arisen in a different way from that which I have just briefly sketched. It is the habit among savage peoples very frequently to name their chiefs after particular animals. When the chief dies, his name survives; and, therefore, in process of time the personality of the man becomes confused with that of the beast, which is thereafter worshipped as the incarnate spirit of the man. For my own part, I think that if this process ever does take place (and I doubt not that it may) it is probably of subordinate importance to the more direct development of fetishism above indicated. But I have no space to go further into this question, which, after all, is one that does not affect the fact of zoolatry, but only the method of its development.

Pre-eminent among all the beasts of the field as an object of worship is the one which is regarded as the most subtle. In ancient times the serpent was habitually worshipped in Egypt, India, Phœnicia, Babylonia, Greece, and Italy. It still continues to be worshipped in Persia, Cashmere, Cambodia, Thibet, China, India, Ceylon, Egypt, South Africa, Coast of Guinea, Madagascar, and the Friendly Islands. In the New World serpent worship appears among the Aztecs, Peruvians, Natchez, Caribs, Monitarris, Mandans, Pueblo Indians, &c. In higher stages of culture the serpent becomes an emblem of eternity, of evil, of wisdom, and of sundry other such abstract ideas.

No less widely distributed than the worship of serpents is the worship of trees. Indeed if I were to make a list of all the peoples among whom this form of worship prevails, the mere enumeration would be tedious. Let it, therefore, be enough to say in general terms, with Sir John Lubbock, that 'this form of religion can be shown to be general to most of the great races of men at a certain stage of mental development'; and Mr. Ferguson regards tree-worship in association with serpent-worship as the primitive faith of mankind. In its earliest or least-developed form this faith consists in attributing to trees the same kind of souls or spirits as are supposed to animate human beings and other animals; at this stage, therefore, trees are supposed to feel, to know, and to understand what is said to them. Later on, however, the faith becomes less and less realistic; and as spirits gradually become converted into deities, independent of material dwelling-places, the trees become more and more symbolical of divinity rather than themselves divine. Hence, the sacred groves of classical times were sacred as places rather than as objects of worship; and it is no doubt a similar survival of this feeling that led the monotheistic writer of the Book of Genesis to speak of the Lord God walking among the trees of Eden in the cool of the day. Indeed, throughout the whole description of Paradise we may see the remnants of tree- and serpent-worship; the knowledge of good and evil, and the principle of everlasting life, are both associated with trees, while the principle of evil is associated with the serpent—which again appears as an emblem in the wanderings of the Israelites. And the very last remnants of such feeling continue to linger around trees and snakes, even after all vestiges of religious belief have departed from them. Thus, for instance, not to go further afield than Scotland, there is in the Isle of Skye an oak wood at Loch Siant the trees of which, up to quite a recent period, were regarded with so superstitious an awe that no one would venture to pull from them the smallest twig.

Owing, no doubt, to such survivals in feeling of religious associations previously connected with trees, in all stages of pre-scientific culture we meet with innumerable superstitions relating to plants.

The plants are no longer worshipped, but they continue to be endowed with sundry magical properties, chiefly in the way of charms. Theophrastus, for example, who may be termed the earliest botanist whose writings have been preserved, tells us that in his day it was considered the proper thing to gather certain herbs with the body turned away from the wind and anointed with oil. The mandragora was only to be cut with a sword, which was to be drawn three times round the plant, with the body facing west, and after having danced around the plant, using obscene language. Similarly, those who sow cummin should only do so while uttering blasphemies. On the other hand, while gathering the black hellebore, it was necessary, after having drawn a line round it, to stand towards the east and pray, being careful all the while to avoid the sight of an eagle, for in that case the gatherer of the plant would die within a year.

With advancing culture superstitions connected with plants become, of course, somewhat less absurd than these; but any one who reads the literature of alchemy may find how hard such superstitions die. And, even in our own day, there are many country places where wise women are believed so far to have inherited the mantle of the old witches that their dealings with herbs for medicinal purposes are invested with a dash of magic; so that their services are more sought after than those of duly qualified practitioners.

There only remains one other feature in the primitive philosophy of natural history deserving to be noticed on account of its generality. This is the doctrine of transmigration of souls. All living things having been endowed with an immortal principle, upon the death of one temporary residence this immortal principle is supposed to enter another. This doctrine survives in its most realistic form even in such comparatively high stages of culture as those of the ancient Egyptians and existing inhabitants of India. As a rule, the belief embodies an ethical principle to the effect that the subsequent life-history of any particular soul is determined by its moral conduct while in any particular body; so that the change of body may be either for the better or the worse. For example, the Buddhists believe that in the next stage of his bodily existence a man who is unduly proud may expect to find himself a worm; or, if he be out and out a bad man, may not find any bodily home at all, but be doomed for ages to wander as a disembodied demon. On the other hand, if a man behaves himself well in this life, he may look for promotion in the next. 'The theory of "karma" or "action," which controls the destiny of all sentient beings, not by judicial reward and punishment, but by the inflexible result of cause and effect, appears entitled to be regarded as one of the most remarkable developments of early speculation in the field of ethical thought.' One of the practical results of this doctrine of the transmigration of souls is to endow the lives of the lower animals with a value equivalent to those of human beings; and hence the dread of destroying the lower animals which is entertained by all the races of mankind who hold the doctrine.

I have now said enough to show that the philosophy of natural history in its most primitive form is universally the philosophy of animism—or the philosophy which ascribes to all living things the attributes of the human soul. This having been clearly noted, the next thing we have to observe is that with advancing culture such philosophy departs from its primitive realism. The souls of living things cease to be quite so manlike; they become more and more detached from organisms; they become less and less the representatives of concrete bodies, while more and more representative of abstract principles. Although they still continue to be regarded as personal, they cease to be fixed to any definite corporeal abodes; they are now something more than spirits incarnate; they begin to assume the nature of gods. The influence of this change of religious conception upon the philosophy of natural history is a marked influence. The sundry forces and processes of nature having been severally relegated to the dominion of personal deities, plants and animals, although still invested with innumerable superstitious ideas surviving from more primitive stages of thought, now take a place in the general system of things, subordinate to the overruling gods. Animism thus becomes transformed into theology; and the natural history of observation gives place to the natural history of myth.

Adequately to treat of mythical natural history would require much more space than can here be allowed; I will therefore merely state some of the general principles which are connected with it.

At first sight we may well deem it somewhat remarkable that man should not have been satisfied, so to speak, with the enormous profusion of vegetable and animal forms upon this earth; but should have proceeded to people the universe with a new creation of his own fancying. And still more remarkable may it appear that, having done this, he should forthwith have proceeded to believe in the actual existence of these imaginary creatures. But here we must remember that mythology was the product of a gradual growth, springing from a desire to explain the causation of natural phenomena. The sun was observed to move across the sky; something must therefore draw or push it; horses were presumed to be the causes of the traction; and, as they might reasonably be supposed to differ somewhat from horses upon earth, they were imagined to be horses of fire. It is not indeed always, or even generally, that we can find in myths so direct a bond of union as this between the phenomenon to be explained and the ideas of causality presented by the explanation; and the impossibility of finding such a bond of union in the majority of cases has led to the most extravagant and improbable systems of myth-analysis at the hands of modern scholars. To me it appears that the safest view for us to adopt is, that the process of myth-formation, although probably always starting from an instinctive desire to explain the causal reasons of observed phenomena, has been a multifarious process, wherein real history of ancestors, allegory, metaphor, and even the most gratuitous imagination, may occur in various measures of indiscriminate quantity. Under these circumstances, and so far as our present subject is concerned, I think it is best to accept the facts of mythology as we find them, without attempting to explain the precise psychological processes which have been concerned in their production.

If, then, we take a general survey of mythological organisms, the first thing that strikes us with reference to them is the fact that they are all compounds of organisms already known to exist. Profuse as the imagination of uncultured man has shown itself to be in the way of creating novel forms of animal life, it never seems to have been able to invent such a form which was in all its parts novel. On the contrary, the animal morphology of myth for the most part consists in joining together in one organism the parts which are distinctive of different organisms—the body of a man to that of a horse, the body of a woman to that of a fish, the legs of a goat to that of a boy, the wings of a bird to the shoulders of a bull, and so on. Very often, indeed, the organs thus separated from their legitimate owners underwent sundry modifications in detail before they were re-mounted in their new positions; and when such modifications were considerable, and still more when a number of different organisms were laid under tribute to the manufacture of a new one, the resulting monster might well claim to exhibit a highly creditable degree of inventive faculty on the part of his creators. Nevertheless, as I have said, this inventive faculty never rose above the comparatively childish level of first pulling animals to pieces, and then reconstructing them piecemeal, although in some few cases the imaginative faculty went so far as to incorporate with the parts of living animals structures of human contrivance, as in the wheeled creatures described by the prophet Ezekiel.

Concurrently with, or following closely upon, the formation of myth, we everywhere find the formation of fable; and in the latter process, as in the former, animals play a highly conspicuous part. At any of the higher levels of culture fabulous animals are well known to be but imaginary animals; so that even our children habitually draw a distinction between the real animals of nature and what they call the 'pretend animals' of fable. Nevertheless, it is only because children are told to draw this distinction that they ever so much as think of drawing it. To the native or unassisted intelligence of a child, any one kind of animal is quite as probable as any other kind—and this not *only with reference to form and size*, but also with reference to habits and endowments. A dragon breathing fire and smoke seems no more intrinsically improbable than a serpent with poison in its mouth; nor is it more unlikely that a mouse should turn into a horse than that a tadpole should turn into a frog. Now the mind of semi-cultured man is in just the same case. Of late years a great deal of investigation has been expended upon the origin of our nursery stories, and the result has been to show that these stories are spread over all quarters of the globe—sometimes just as they are told to our own children, but more usually with a certain amount of variation, which is enough to render it doubtful whether they all migrated from a single source or were independent inventions in different localities. But in all cases the probability appears to be that when first promulgated they were accepted, not as romances, but as true histories; and that they continued to be so accepted until advancing civilization slowly undermined their credibility. Gradually, therefore, they followed the fate of myths—passing from the region of history to that of poetry, and thus following a general law of mental evolution, namely, that beliefs, which are matters of serious earnest in one stage of culture, in succeeding stages survive only as matters of amusement, or, at most, of aesthetic feeling. And such is now the position which is occupied among ourselves by the whole elaborate and multifarious natural history of myth and fable. When we look at the unicorn displaying his poetic morphology upon our royal insignia, the double-headed eagle of Austria, or any of the other monstrosities which now serve as national emblems, we may see in them the last survivals of the first attempts which were made by mankind to construct a philosophy of natural history.

When we turn to the special exhibition in the Bible of primitive ideas connected with plants and animals, and look to the authors of the Pentateuch, the Book of Job, or the supposed writings of Solomon, our attention as naturalists investigating their ideas upon natural history is arrested by the accuracy of their observations. We find, indeed, that the Mosaic writer has fallen into the error of classifying the hare as a ruminant, a bat as a bird, possibly a whale as a fish, and including under one category the most diverse natural groups as 'creeping things.' But all these errors arise merely from an absence of morphological knowledge, which clearly could not have been attainable at that time. Barring this necessary ignorance, however, it appears to me that these early Biblical writers have displayed a really wonderful degree of accuracy in their observations of plants and animals—wonderful, I mean, if contrasted with similar observations by men of other races at a comparable level of culture. If we except certain passages in the Book of Job, which appear to assume the real existence of fabulous animals—although even here the charge of inaccuracy is not admissible, from its being impossible to determine whether the allusions are intended to be taken literally or poetically—there is no other instance where the animals either of fable or of myth are countenanced. On the other hand, remarkable accuracy is displayed by the early Biblical writers in their observations of external morphology, as well as of the habits and instincts of animals. In that curious and elaborate enumeration of animals as clean and unclean with which we meet in the eleventh chapter of Leviticus, it is an accurate idea of morphological classification which leads the writer to fix upon the parted hoof and chewing of the cud as features of what we should now term taxonomic importance; and when, later on, we find the whole animal kingdom classified with reference to merely external form, number of limbs, and modes of progression, we must not neglect to notice the systematic observation which is displayed, and which, so far as it goes, is wonderfully true to nature. There is no imagery of any kind mixed up with the facts; the classification is throughout dictated by the true spirit of science; and it cannot be said to have been subsequently improved upon until the foundations of biology were laid by the commanding genius of Aristotle.

Again, as regards the habits and instincts of animals, we read in Proverbs vi. 6–8, 'Go to the ant, thou sluggard; consider her ways and be wise; which having no guide, overseer, or ruler, provideth her meat in the summer, and gathereth her food in the harvest.' Owing to the authority of Huber, the statement here made that ants display an instinct of harvesting was regarded by latter-day naturalists as mythical. More recent observations, however, have fully vindicated the accuracy of the older naturalist, and this without impugning that of Huber. The discrepancy between the two is owing merely to their having observed the habits of ants in different geographical areas. The species of ants observed by the Biblical writer in Palestine have now been found to collect grain in the summer-time, and to store it in granaries for winter consumption; while the species observed in Europe by Huber presents no such instinct. But ants with harvesting instincts have now also been found in the South of Europe, in India, and in America. Seeing then that here, as elsewhere, Solomon has proved himself to have been an accurate observer, it is much to be regretted that his disquisitions on natural history, of which we read in the Book of Kings, should all have been lost. Had these been still extant, they would have presented a high degree of historical interest as the utterances of the most ancient of professed naturalists For, 'he spoke of trees, from the cedar tree that is in Lebanon even unto the hyssop that springeth out of the wall; he spake also of beasts, and of fowl, and of creeping things, and of fishes. And there came of all people to hear the wisdom of Solomon, from all kings of the earth which had heard of his wisdom.'

Again, whatever may be its date, how interesting is the natural history of Job, which, notwithstanding the writer's unrestricted flights of poetry, is, as already remarked, almost always true to fact, save where the statements are plainly hyperbolical. What, for instance, can be more graphic than the description of the ostrich: 'What time she lifteth up herself on high, she scorneth the horse and his rider'? Or what can be more accurate than the description of this bird's peculiar instincts of incubation: 'She leaveth her eggs in the earth, and warmeth them in dust, and forgetteth that the foot may crush them, or that the wild beast may break them. She is hardened against her young ones as though they were not hers'? This peculiarity of instinct on the part of the ostrich is likewise alluded to in the Book of Lamentations, where the writer contrasts it with the maternal instincts of other animals, and this in a passage which seems to indicate that the writer was aware of the mammalian character, if not of Cetacea, at all events of Seals; for he says: 'Even the sea monsters draw out the breast: they give suck to their young ones.'

But I must now draw to a close these few and imperfect remarks on the natural history of the Bible, and I will do so by briefly considering that portion of this natural history which, during the last fifty years, has excited more interest and more controversy than any passage of similar length in the whole literature of the world. I mean, of course, the first chapter of Genesis.

The great battle between the theologians and men of science began in the field of astronomy. Then it passed to the field of geology, and it was not until the antiquity of the globe, the reality of fossils, and all the other positions had been finally taken by the geologists that the battle was resumed with renewed fury against the biologists. Here the points in dispute cannot yet be said to have been finally settled, if by a settlement we mean a general acquiescence by theologians in the doctrine of naturalists. The principal fight has been around the question of evolution as against special creation. But, besides this principal fight, there has been a kind of subordinate fight over the order of succession of vegetable and animal life upon the globe. Now, here the question is a simple question of fact, and ought not to admit of any reasonable dispute. For no one nowadays ventures to impugn the accuracy of the geological record. The only question, therefore, is as to whether or not the first chapter of Genesis is in agreement with this record. And the answer to this question is perfectly plain. In some respects the two records are in agreement, while in other respects they are not. In order to show at once the points of agreement and the points of disagreement, I will place the two records side by side.

Record of Genesis.	*Record of Geology.*
Grass, herbs, trees.	Certain cryptogamous plants[1].
Aquatic animals and birds.	Certain invertebrata.
Cattle, creeping things.	Certain fish.
Beasts of the earth.	Certain trees[2]; amphibia
Man.	Certain reptiles.
	Certain birds[3].
	Certain mammals.
	Man.

Now, it is evident that we here have a general correspondence, but it is no less evident that the correspondence is only general, or that it fails in most points of detail. In the first place, while the Biblical record appears to represent each group of living things as having been formed in its entirety before the appearance of the next group, the scientific record shows that no one group was ever thus completed before the appearance of succeeding groups. In the case of every group, the process of species-formation was concurrent with that of some of the other groups. Therefore, in the record of geology, I have prefaced each of the groups with the word 'certain,' in order to indicate that, at the period represented, only a very small fractional number of the forms comprised within that group had at that time made their appearance.

Thus, for example, we find that in the Biblical record all the forms of vegetable life are represented as having been in existence before any of the forms of animal life. At least it appears to me that this is the only meaning we can properly ascribe to the expression 'grass, herbs, and trees.' But, if so, of course this statement of Genesis is very far wide of the truth. Similarly it is represented that all aquatic animals appeared before any terrestrial animals. Now, although it is probably true that *animal life upon this globe began in the water*, it is certainly not true that all the forms of aquatic animals had made their appearance before any of the terrestrial forms. On the contrary, it was only a small proportional part of the former which had been evolved before some of them became adapted to live upon dry land. Moreover, the Genesis account expressly includes under the category of aquatic animals 'every creature that moveth' in the waters, up even to 'great whales.' It thus becomes impossible to limit the class aquatic animals to aquatic invertebrata and fish. And, even if this could be done, the difficulty would still remain that terrestrial invertebrata are represented (under the name of 'creeping things') as appearing long subsequently to aquatic invertebrata, seeing that they are said to have appeared subsequently to birds, and even to cattle. For we find that birds, and even cattle, are said to have appeared before 'creeping things,' which we can only understand to mean insects, snails, amphibia, reptiles, &c., as these are classed together in Leviticus under the same term. Lastly, it follows from these discrepancies that matters are in no way mended by supposing the record of Genesis to mean what it does not say, or to indicate only the earliest appearance of any '*representatives*' of the sundry classes named.

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[1] Probably.

[2] i. e. tree-ferns.

[3] But no actual proof of birds before mammals

This, I think, is enough to show how misguided are the attempts of so-called 'reconcilers,' who endeavour to force upon the account given in Genesis the results of modern investigation. These reconcilers always proceed in the same way. They first magnify the points of agreement, and next endeavour by sundry artifices of rhetoric to cover up the points of disagreement; then they represent that, on the whole, the agreement is so remarkable that it can only be explained by the hypothesis of inspiration. Now it is no business of mine either to impugn or to vindicate the hypothesis of inspiration; but I may observe that those who have the interests of this hypothesis at heart are only displaying their own shortsightedness by seeking to befriend it in any such way as this. Even if the coincidence between Genesis and geology had been very much more close than it is, surely it would have been a somewhat slender thread of argument on which to hang so important a doctrine. But, as the matter stands, there is nothing in the cosmology of Genesis which we might not have expected to meet with in the early philosophy of natural history. The idea pervading the alleged order of succession appears to me a sufficiently obvious, and, when properly considered, a very interesting idea. It is the idea of a progressive advance from the less to the more highly organized;

and I doubt not that, if the writer had known more about the internal anatomy of the animal kingdom, his record would have been in very much closer agreement with that of modern science than we have seen it to be.

II.

THE DARWINIAN THEORY OF INSTINCT.

'GAVEST thou the goodly wings unto the peacocks? or wings and feathers unto the ostrich? which leaveth her eggs in the earth, and warmeth them in the dust, and forgetteth that the foot may crush them, or that the wild beast may break them. . . . Because God hath deprived her of wisdom, neither hath He imparted to her understanding.'

This is the oldest theory of instinct. The writer of that sublime monument of literary power in which it occurs observed a failure of instinct on the part of the ostrich, and forthwith attributed the fact to neglect on the part of the Deity; the implication plainly being that in all cases where instinct is perfect, or completely suited to the needs of the animal presenting it, the fact is to be attributed to a God-given faculty of wisdom. This, I say, is the oldest theory of instinct, and I may add that, until within the past twenty-five years, it has been the only theory of instinct. I think, therefore, I ought to begin by explaining that this venerable and time-honoured theory is a purely theological explanation of the ultimate source of instinct, and therefore cannot be affected by any scientific theory as to the proximate causes of instinct. It is with such a theory alone that we shall here be concerned. 'When giants build, men must bring the stones.' For the past eight or ten years I have been engaged in elaborating Mr. Darwin's theories in the domain of psychology, and I cannot allude to my own work in this connexion without expressing the deep obligations under which I lie to his ever ready and ever generous assistance—assistance rendered not only in the way of conversation and correspondence, but also by his kindness in making over to me all his unpublished manuscripts, together with the notes and clippings which he had been making for the past forty years in psychological matters. I have now gone carefully through all this material, and have published most of it in my work on *Mental Evolution in Animals*. I allude to this work on the present occasion in order to observe that, as it has so recently come out, I shall feel myself entitled to assume that few have read it; and therefore I shall not cramp my remarks by seeking to avoid any of the facts or arguments therein contained.

As there are not many words within the compass of our language which have their meanings less definitely fixed than the word 'instinct,' it is necessary that I should begin by clearly defining the sense in which I shall use it.

In general literature and conversation we usually find that instinct is antithetically opposed to reason, and this in such wise that the mental operations of the lower animals are termed instinctive; those of man being termed rational. This rough and ready attempt at psychological classification has descended to us from remote antiquity, and, like kindred attempts at zoological classification, is not a bad one so far as it goes. To divide the animal kingdom into beasts, fowls, fish, and creeping things, is a truly scientific classification as far as it goes, only it does not go far enough for the requirements of more careful observation; that is to say, it only recognizes the more obvious and sometimes only superficial differences, while it neglects the more hidden and usually more important resemblances. And to classify all the mental phenomena of animal life under the term 'instinct,' while reserving the term 'reason' to designate a mental peculiarity distinctive of man, is to follow a similarly archaic method. It is quite true that instinct preponderates in animals, while reason preponderates in man. This obvious fact is what the world has always seen, just as it saw that flying appeared to be distinctive of birds, and creeping of reptiles. Nevertheless, a bat was all the while a mammal, and a pterodactyl was not a bird; and it admits of proof as definite that what we call instinct in animals occurs in man, and that what we call reason in man occurs in animals. This, I mean, is the case if we wait to attach any definition to the words which we employ. It is quite evident that there is some difference between the mind of a man and the mind of a brute, and if, without waiting to ascertain what this difference is, we say that it consists in the presence or absence of the faculty of reason we are making the same kind of mistake as when we say that the difference between a bird and a mammal consists in the presence or absence of the faculty of flying. Of course, if we choose, we may employ the word 'reason' to signify all the differences taken together, whatever they may be; and so, if we like, we may use the word 'flying.' But in either case we shall be talking nonsense, because we should be divesting the words of their meaning, or proper sense. The meaning of the word 'reason' is the faculty of ratiocination—the faculty of drawing inferences from a perceived equivalency of relations, no matter whether the relations involve the simplest mental perceptions, or the most abstruse mathematical calculations. And in this, the only real and proper sense of the word, reason is not the special prerogative of man, but occurs through the zoological scale at least as far down as the articulata.

What then is to be our definition of instinct?

First of all, instinct involves *mental* operation, and therefore implies consciousness. This is the point which distinguishes instinct from reflex action. Unless we assume that a new-born infant, for example, is conscious of sucking, it is as great a misnomer to term its adaptive movements in the performance of this act instinctive as it would be similarly to term the adaptive movements of its stomach subsequently performing the act of digestion.

Next, instinct implies hereditary knowledge of the objects and relations with respect to which *it is exercised; it may therefore operate in* full perfection prior to any experience on the part of the individual. When the pupa of a bee, for instance, changes into an imago, it passes suddenly from one set of experiences to another, the difference between its previous life as a larva and its new life as an imago being as great as the *difference between the lives of two animals* belonging to two different sub-kingdoms; yet as soon as its wings are dry it exhibits all the complex instincts of the mature insect in full perfection. And the same is true of the instincts of vertebrated animals, as we know from the researches of the late Mr. Douglas Spalding and others.

Again, instinct does not imply any necessary knowledge of the relations between means employed and ends attained. Such knowledge may be present in any degree of distinctness, or it may not be present at all; but in any case it is immaterial to the exercise of the instinct. Take, for example, the instinct of the Bembex. This insect brings from time to time fresh food to her young, and remembers very exactly the entrance to her cell, although she has covered it with sand, so as not to be distinguishable from the surrounding surface. Yet M. Fabre found that if he brushed away the earth and the underground passage leading to the nursery, thus exposing the contained larva, the parent insect 'was quite at a loss, and did not even recognize her own offspring. It seemed as if she knew the doors, nursery, and the passage, but not her child.'

Lastly, instinct is always similarly manifested under similar circumstances by all the individuals of the same species. And, it may be added, these circumstances are always such as have been of frequent occurrence in the life-history of the species.

Now in all these respects instinct differs conspicuously from every other faculty of mind, and especially from reason. Therefore, to gather up all these *differentiae* into one definition, we may say that instinct is the name given to those faculties of mind which are concerned in consciously adaptive action, prior to individual experience, without necessary knowledge of the relation between means employed and ends attained; but similarly performed under similar and frequently recurring circumstances by all the individuals of the same species.

Such being my definition of instinct, I shall now pass on to consider Mr. Darwin's theory of the origin and development of instincts.

Now, to begin with, Mr. Darwin's theory does not, as many suppose that it does, ascribe the origin and development of all instincts to natural selection. This theory does, indeed, suppose that natural selection is an important factor in the process; but it neither supposes that it is the only factor, nor even that, in the case of numberless instincts, it has had anything at all to do with their formation. Take, for example, the instinct of wildness, or of hereditary fear as directed towards any particular enemy—say man. It has been the experience of travellers, who have first visited oceanic islands without human inhabitants and previously unvisited by man, that the animals are destitute of any fear of man. Under such circumstances the birds have been known to alight on the heads and shoulders of the new-comers, and wolves to come and eat meat held in one hand while a knife was held ready to slay them with the other. But this primitive fearlessness of man gradually passes into an hereditary instinct of wildness, as the special experiences of man's proclivities accumulate; and as this instinct is of too rapid a growth to admit of our attributing it to natural selection (not one per cent. of the animals having been destroyed before the instinct is developed) we can only attribute its growth to the effects of inherited observation. In other words, just as, in the lifetime of the individual, adjustive actions which were originally intelligent may by frequent repetition become automatic, so, in the lifetime of the species, actions originally intelligent may, by frequent repetition and heredity, so unite their efforts on the nervous system that the latter is prepared, even before individual experience, to perform adjustive actions mechanically which, in previous generations, were performed intelligently. This mode of origin of instincts has been appropriately called the 'lapsing of intelligence,' and it was fully recognized by Mr. Darwin as a factor in the formation of instinct.

The Darwinian theory of instinct, then, attributes the evolution of instincts to these two causes acting either singly or in combination—natural selection and lapsing intelligence. I shall now proceed to adduce some of the more important facts and considerations which, to the best of my judgement, support this theory, and show it to be by far the most comprehensive and satisfactory explanation of the phenomena which has hitherto been propounded.

That many instincts must have owed their origin and development to natural selection exclusively is, I think, rendered evident by the following general considerations:—

(1) Considering the great importance of instincts to species, we are prepared to expect that they must be in large part subject to the influence of natural selection. (2) Many instinctive actions are performed by animals too low in the scale to admit of our supposing that the adjustments which are now instinctive can ever have been intelligent. (3) Among the higher animals instinctive actions are performed at an age before intelligence, or the

power of learning by individual experience, has begun to assert itself. (4) Many instincts, as we now find them, are of a kind which, although performed by intelligent animals at a matured age, yet can obviously never have been originated by intelligent observation. Take, for instance, the instinct of incubation. It is quite impossible that any animal can ever have kept its eggs warm with the intelligent purpose of developing their contents; so we can only suppose that the incubating instinct began in some such form as we now see it in the spider, where the object of the process is protection, as distinguished from the imparting of heat. But incidental to such protection is the imparting of heat, and, as animals gradually became warm-blooded, no doubt this latter function became of more and more importance to incubation. Consequently, those individuals which most constantly cuddled their eggs would develop most progeny, and so the incubating instinct would be developed by natural selection without there ever having been any intelligence in the matter.

From these four general considerations, therefore, we may conclude (without waiting to give special illustrations of each) that one mode of origin of instincts consists in natural selection, or survival of the fittest, continuously preserving actions which, although never intelligent, yet happen to have been of benefit to the animals which first chanced to perform them. Among animals, both in a state of nature and domestication, we constantly meet with individual peculiarities of disposition and of habit, which in themselves are utterly meaningless, and therefore quite useless. But it is easy to see that, if among a number of such meaningless or fortuitous psychological variations any one arises which happens to be of use, this variation would be seized upon, intensified, and fostered by natural selection, just as in the analogous case of structures. Moreover there is evidence that such fortuitous variations in the psychology of animals (whether useless or accidentally useful) are frequently inherited, so as to become distinctive not merely of individuals, but of races or strains. Thus, among Mr. Darwin's manuscripts I find a letter from Mr. Thwaits under the date 1860, saying that all his domestic ducks *in Ceylon had quite lost their natural instincts* with regard to water, which they would never enter *unless driven, and that when the young birds* were thus compelled to enter the water they had to be quickly taken out again to prevent them from drowning. Mr. Thwaits adds that this peculiarity only occurs in one particular breed. Tumbler-pigeons instinctively tumbling, pouter-pigeons instinctively pouting, &c., are further illustrations of the same general fact.

Coming now to instincts developed by lapsing intelligence, I have already alluded to the acquisition of an hereditary fear of man as an instance of this class. Now not only may the hereditary fear of man be thus acquired through the observation of ancestors—and this even to the extent of knowing by instinct what constitutes safe distance from fire-arms; but, conversely, when fully formed it may again be lost by disuse. Thus there is no animal more wild, or difficult to tame, than the young of the wild rabbit; while there is no animal more tame than the young of the domestic rabbit. And the same remark applies, though in a somewhat lesser degree, to the young of the wild and of the domestic duck. For, according to Dr. Rae, 'If the eggs of a wild duck are placed with those of a tame duck under a hen to be hatched, the ducklings from the former, on the very day they leave the egg, will immediately endeavour to hide themselves, or take to the water, if there be any water, should any one approach, whilst the young from the tame duck's eggs will show little or no alarm.' Now, as neither rabbits nor ducks are likely to have been selected by man to breed from on account of tameness, we may set down the loss of wildness in the domestic breeds to the uncompounded effects of hereditary memory of man as a harmless animal, just as we attributed the original acquisition of instinctive wildness to the hereditary memory of man as a dangerous animal; in neither case can we suppose that the principle of selection has operated in any considerable degree.

Thus far, for the sake of clearness, I have dealt separately with these two factors in the formation of instinct—natural selection and lapsing intelligence—and have sought to show that either of them working singly is sufficient to develop some instincts. But, no doubt, in the case of most instincts intelligence and natural selection have gone hand-in-hand, or co-operated, in producing the observed results—natural selection always securing and rendering permanent any advances which intelligence may have made. Thus, to take one case as an illustration. Dr. Rae tells me that the grouse of North America have the curious instinct of burrowing a tunnel just below the surface of the snow. In the end of this tunnel they sleep securely, for, when any four-footed enemy approaches the mouth of the tunnel, the bird, in order to escape, has only to fly up through the thin covering of snow. Now in this case the grouse probably began to burrow in the snow for the sake of warmth, or concealment, or both; and, if so, thus far the burrowing was an act of intelligence. But the longer the tunnel the better would it serve in the above-described means of escape; therefore natural selection would tend to preserve the birds which made the longest tunnels, until the utmost benefit that length of tunnel could give had been attained.

And, similarly, I believe, all the host of animal instincts may be fully explained by the joint operation of these two causes—intelligent adjustment and survival of the fittest. For now I may draw attention to another fact which is of great importance, viz., that instincts admit of being modified as modifying circumstances may require.

In other words, instincts are not rigidly fixed, but are plastic, and their plasticity renders them capable of improvement or of alteration, according as intelligent observation requires. The assistance which is thus rendered by intelligence to natural selection must obviously be very great, for, under any change in the surrounding conditions of life which calls for a corresponding change in the ancestral instincts of the animal, natural selection is not left to wait, as it were, for the required variations to arise fortuitously; but is from the first furnished by the intelligence of the animal with the particular variations which are needed.

In order to demonstrate this principle of the variation of instinct under the guidance of intelligence, I may here introduce a few examples.

Huber observes, 'How ductile is the instinct of bees, and how readily it adapts itself to the place, the circumstances, and the needs of the community.' Thus, by means of contrivances, which I need not here explain, he forced the bees either to cease building combs or to change their instinctive mode of building from above downwards to building in the reverse direction, and also horizontally. The bees in each case changed their mode of building accordingly. Again, an irregular piece of comb, when placed by Huber on a smooth table, tottered so much that the humble bees could not work on so unsteady a basis. To prevent the tottering, two or three bees held the comb by fixing their front feet on the table, and their hind feet on the comb. This they continued to do, relieving guard, for three days, until they had built supporting pillars of wax. Some other humble bees, when shut up, and so prevented from getting moss wherewith to cover their nests, tore threads from a piece of cloth, and 'carded them with their feet into a fretted mass,' which they used as moss. Lastly, Andrew Knight observed that his bees availed themselves of a kind of cement made of iron and turpentine, with which he had covered some decorticated trees—using this ready-made material instead of their own propolis, the manufacture of which they discontinued; and more recently it has been observed that bees 'instead of searching for pollen, will gladly avail themselves of a very different substance, namely, oatmeal.' Now in all these cases it is evident that if, from any change of environment, such accidental conditions were to occur in a state of nature the bees would be ready at any time to meet them by intelligent adjustment, which, if continued sufficiently long and aided by selection, would pass into true instincts of building combs in new directions, of supporting combs during their construction, of carding threads of cloth, of substituting cement for propolis, and of oatmeal for pollen.

Turning to higher animals, Andrew Knight tells us of a bird which, having built her nest upon a forcing-house, ceased to visit it during the day when the heat of the house was sufficient to incubate the eggs; but always returned to sit upon the eggs at night when the temperature of the house fell. Again, thread and worsted are now habitually used by sundry species of birds in building their nests, instead of wool and horsehair, which in turn were no doubt originally substitutes for vegetable fibres and grasses. This is especially noticeable in the case of the tailor-bird, which finds thread the best material wherewith to sew. The common house-sparrow furnishes another instance of intelligent adaptation of nest-building to circumstances; for in trees it builds a domed nest (presumably, therefore, the ancestral type), but in towns avails itself by preference of sheltered holes in buildings, where it can afford to save time and trouble by constructing a loosely formed nest. Moreover, the chimney- and house-swallows have similarly changed their instincts of nidification, and in America this change has taken place within the last two or three hundred years. Indeed, according to Captain Elliott Coues, all the species of swallow on that continent (with one possible exception) have thus modified the sites and structures of their nests in accordance with the novel facilities afforded by the settlement of the country.

Another instructive case of an intelligent change of instinct in connexion with nest-building is given from a letter by Mr. Haust, dated New Zealand, 1862, which I find among Mr. Darwin's manuscripts. Mr. Haust says that the Paradise ducks, which naturally or usually build their nests along the rivers on the ground, have been observed by him on the east of the island, when disturbed in their nests upon the ground, to build 'new ones on the tops of high trees, afterwards bringing their young ones down on their backs to the water'; and exactly the same thing has been recorded by another observer of the wild ducks of Guiana. Now, if intelligent adjustment to peculiar circumstances is thus adequate, not only to make a whole breed or species of bird transport their young upon their backs—or, as in the case of the woodcock, between their legs—but even to make web-footed water-fowl build their nests in high trees, I think we can have no doubt that if the need of such adjustment were of sufficiently long continuance the intelligence which leads to it would eventually produce a new and remarkable modification of their ancestral instinct of nest-building.

Turning now from the instinct of nidification to that of incubation, I may give one example to show the plasticity of the instinct in relation to the observed requirements of progeny. Several years ago I placed in the nest of a sitting Brahma hen four newly-born ferrets. She took to them almost immediately, and remained with them for rather more than a fortnight, when I made a separation. During the whole of the time the hen had to sit upon the nest, for the young ferrets were not able to follow her about, as young chickens would have done. The hen was very much puzzled by the lethargy of her offspring, and two or three times a day she used to fly off the nest, calling on her brood to follow; but, on hearing their cries of distress from cold, she always returned immediately, and sat with patience for six or seven hours more. I found that it only took the hen *one day to learn the meaning* of their cries of distress; for after the first day she would always run in an agitated manner to any place where I concealed the ferrets, provided that this place was not too far away from the nest to prevent her from hearing the cries of distress. Yet I do not think it would be possible to imagine a greater contrast between two cries than the shrill piping note of a young chicken and the hoarse growling noise of a young ferret. At times the hen used to fly off the nest with a loud scream, which was doubtless due to the unaccustomed sensation of being gripped by the young ferrets in their search for the teats. It is further worthy of remark that the hen showed so much anxiety when the ferrets were taken from the nest to be fed that I adopted the plan of giving them the milk in their nest, and with this arrangement the hen seemed quite satisfied; at any rate she used to chuck when she saw the milk coming, and surveyed the feeding with evident satisfaction.

Thus we see that even the oldest and most important instincts in bees and birds admit of being greatly modified, both in the individual and in the race, by *intelligent adaptation* to changed conditions of life; and therefore we can scarcely doubt that the principle of lapsing intelligence must be of much assistance to that of natural selection in the origination and development of instincts.

I shall now turn to another branch of the subject. From the nature of the case it is not to be expected that we should obtain a great variety of instances among wild animals of new instincts acquired under human observation, seeing that the conditions of their life, as a rule, remain pretty uniform for any periods over which human observation can extend. But, from a time before the beginning of history, mankind, in the practice of domesticating animals, has been making what we may deem a gigantic experiment upon the topic before us.

The influences of domestication upon the psychology of animals may be broadly considered as both negative and positive—negative in the obliteration of natural instincts; positive in the creation of artificial instincts. We will consider these two branches separately. Here we may again revert to the obliteration of natural wildness. We all know that the horse is an easily breakable animal, but his nearest allies in a state of nature, the zebra and the quagga, are the most obstinately unbreakable of animals. Similar remarks apply to the natural wildness of all wild species of kine, as contrasted with the innate tameness of our domesticated breeds. Consider again the case of the cat. The domesticated animal is sufficiently tame, even from kittenhood, whereas its nearest cousin in a state of nature, the wild cat, is perhaps of all animals the most untameable. But of course it is in the case of the dog that we meet with the strongest evidence on this point. The most general and characteristic features in the psychology of all the domesticated varieties are faithfulness, docility, and sense of dependence upon a master; whereas the most usual and characteristic features in the psychology of all the wild species are fierceness, treachery, and self-reliance. But, not further to pursue the negative side of this subject, let us now turn to the positive, or to the power which man has shown himself to possess of implanting new instincts in the mental constitution of animals. For the sake of brevity I shall here confine myself to the most conspicuous instance, which is of course furnished by the dog, seeing that the dog has always been selected and trained with more or less express reference to his mental qualities. And here I may observe that in the process of modifying psychology by domestication exactly the same principles have been brought into operation as those to which we attribute the modification of instincts in general; for the processes of artificial selection and training in successive generations are precisely analogous to the processes of natural selection and lapsing of intelligence in a state of nature.

Touching what Mr. Darwin calls the artificial instincts of the dog, I may first mention those which he has himself dilated upon—I mean the instincts of pointing, retrieving, and sheep-tending; but as Mr. Darwin has already fully treated of these instincts I shall not go over the ground which he has traversed, but shall confine myself to the consideration of another artificial instinct, which, although not mentioned by him, seems to me of no less significance—I mean the instinct of guarding property. This is a purely artificial instinct, created by man expressly for his own purposes: and it is now so strongly ingrained in the intelligence of the dog that it is unusual to find any individual animal in which it is wholly absent. Thus, we all know that without any training a dog will allow a stranger to pass by his master's gate without molestation, but that as soon as the stranger passes within the gate, and so trespasses upon what the dog knows to be his master's territory, the animal immediately begins to bark in order to give his master notice of the invasion. And this leads me to observe that barking is itself an artificial instinct, developed, I believe, as an offshoot from the more general instinct of guarding property. None of the wild species of dog are known to bark, and therefore we must conclude that barking is an artificial instinct, acquired for the purpose of notifying to his master the presence of thieves or enemies. I may further observe that this instinct of guarding property extends to the formation of an instinctive idea, on the part of the animal, of itself constituting part of that property. If, for instance, a friend gives you temporary charge of his dog, even although the dog may never have seen you before, observing that you are his master's friend and that his master intends you to take charge of him, he immediately transfers his allegiance from his master to you, as to a deputed owner, and will then follow you through any number of crowded streets with the utmost confidence. Thus, whether we look to the negative or to the positive influences of domestication upon the psychology of the dog, we must conclude that a change has been wrought, so profound that the whole mental constitution of the animal now presents a more express reference to the needs of another, and his enslaving animal, than it does to his own. Indeed, we may say that there is no one feature in the whole psychology of the dog which has been left unaltered by the influence of man, excepting only those instincts which, being neither useful nor harmful to man, have never been subject to his operation—such, for instance, as the instinct of burying food, turning round to make a bed before lying down, &c.

I will now turn to another branch of the subject, and one which, although in my opinion of the greatest importance, has never before been alluded to; I mean the local and specific variations of instinct. By a local variation of instinct, I mean a variation presented by a species in a state of nature over some particular area of geographical distribution. It is easy to see the importance of such local variations of instinct as evidence of the transmutation of instinct, if we reflect that such a local variation is obviously on its way to becoming a new instinct. For example, the beavers in California have ceased to make dams, the hyenas in South Africa have ceased to make burrows, and there is a squirrel in the neighbourhood of Mount Airy which has developed carnivorous tastes—running about the trees, not to search for nuts, but to search for birds, the blood of which it sucks. In Ohinitahi there is a mountain parrot which, before the settlement of the place, was a honey-eater, but when sheep were introduced the birds found that mutton was more palatable to them than honey, and quickly abandoned their ancestral habits, exchanging their simple tastes of honey-eaters for the savageness of tearers of flesh. For the birds come in flocks, single out a sheep, tear out the wool, and, when the sheep, exhausted by running about, falls upon its side, they bore into the abdominal cavity to get at the fat which surrounds the kidneys.

These, I think, are sufficient instances to show what I mean by local variations of instinct. Turning now to the specific variations, I think they constitute even stronger evidence of the transmutation of instinct; for where we find an instinct peculiar to a species, or not occurring in any other species of the genus, we have the strongest possible evidence of that particular instinct having been specially developed in that particular species. And this evidence is of particular cogency when, as sometimes happens, the change of instinct is associated with structures pointing to the state of the instincts before the change. Thus, for example, the dipper belongs to a non-aquatic family of birds, but has developed the instinct, peculiar to its species, of diving under water and running along the bottoms of streams. The species, however, has not had time, since the acquisition of this instinct, to develop any of the structures which in all aquatic families of birds are correlated with their aquatic instincts, such as webbed feet, &c. That is to say, the bird retains all its structural affinities, while departing from the family type as regards its instincts. A precisely converse case occurs in certain species of birds belonging to families which are aquatic in their affinities, these species, however, having lost their aquatic instincts. Such is the case, for example, with the upland geese. These are true geese in all their affinities, retaining the webbed feet, and all the structures suited to the display of aquatic instincts; yet they never visit the water. Similarly, there are species of parrots and tree frogs, which, while still retaining the structures adapted to climbing trees, have entirely lost their arboreal habits. Now, short of actual historical or palaeontological information—which of course in the case of instincts is unattainable, seeing that instincts, unlike structures, never occur in a fossil state—short, I say, of actual historical or palaeontological information, we could have no stronger testimony to the fact of transmutation of instincts than is furnished by such cases, wherein a particular species, while departing from the instinctive habits of its nearest allies, still retains the structures which are only suited to the instincts now obsolete.

Now this last head of evidence—that, namely, as to local and specific variations of instincts—differs in one important respect from all the other heads of evidence which I have previously adduced. For, while these other heads of evidence had reference to the theory concerning the *causes* of transmutation, this head of evidence has reference to the *fact* of transmutation. Whatever, therefore, we may think concerning the evidence of the causes, this evidence is quite distinct from that on which I now rely as conclusive proof of the fact.

I shall now, for the sake of fairness, briefly allude to the more important cases of special difficulty which lie against Mr. Darwin's theory of the origin and development of instincts. For the sake of brevity, however, I shall not allude to those cases of special difficulty which he has himself treated in the *Origin of Species* but shall confine myself to considering the other and most formidable cases which, after surveying all the known instincts presented by animals, I have felt to be such.

First, we have the alleged instinct of the scorpion committing suicide when surrounded by fire. This instinct, if it really exists, would no doubt present a difficulty, because it is clearly an instinct which, being not only of no use, but actually detrimental both to the individual and the species, could never have been developed either by natural selection or by lapsing intelligence. I may, however, dismiss this case with a mere mention, because as yet the evidence is not sufficiently precise to admit of our definitely accepting the facts.

There can be no such doubt, however, attaching to another instinct largely prevalent among insects, and which is unquestionably detrimental, both to the individual and to the species. I allude to the instinct of flying through flame. This is unquestionably a true instinct, because it is manifested by all individuals of the same species. How then are we to explain its occurrence? I think we may do so by considering, in the first place, that flame is not a sufficiently common object in nature to lead to any express instinct for its avoidance; and in the next place by considering that insects unquestionably manifest a disposition to approach and examine shining objects. Whether this disposition is due to mere curiosity, or to a desire to ascertain if the shining objects will, like flowers, yield them food, is a question which need not here concern us. We have merely to deal with the fact that such a general disposition is displayed. Taking then this fact, in connexion with the fact that flame is not a sufficiently common object in nature to lead to any instinct expressly directed towards its avoidance, it seems to me that the difficulty we are considering is a difficulty no longer.

The shamming-dead of insects appears at first sight a formidable difficulty, because it is impossible to understand how any insect can have acquired the idea either of death or of its intentional simulation. This difficulty occurred to Mr. Darwin thirty or forty years ago, and among his manuscripts I find some very interesting notes of experiments upon the subject. He procured a number of insects which exhibited the instinct, and carefully noted the attitude in which they feigned death. Some of these insects he then killed, and he found that in no case did the attitude in which they feigned death resemble the attitude in which they really died. Consequently we must conclude that all the instinct amounts to is that of remaining motionless, and therefore inconspicuous, in the presence of danger; and there is no more difficulty in understanding how such an instinct as this should be developed by natural selection in an animal which has no great powers of locomotion than there is in understanding how the instinct to run away from danger should be developed in another animal with powers of rapid locomotion. The case, however, is not, I think, quite so easy to understand in the feigning death of higher animals. From the evidence which I have I find it almost impossible to doubt that certain birds, foxes, wolves, and monkeys, not to mention some other and more doubtful cases, exhibit the peculiarity of appearing dead when captured by man. As all these animals are highly locomotive, we cannot here attribute the fact to protective causes. Moreover, in these animals this behaviour is not truly instinctive, inasmuch as it is not presented by all, or even most, individuals. As yet, however, observation of the facts is insufficient to furnish any data as to their explanation, although I may remark that possibly they may be due to the occurrence of the mesmeric or hypnotic state, which we know from recent researches may be induced in animals under the influence of forcible manipulation.

The instinct of feigning injury by certain birds presents a peculiar difficulty. As we all know, partridges, ducks, and plovers, when they have a brood of young ones, and are alarmed by the approach of a carnivorous quadruped, such as a dog, will pretend to be wounded, flapping along the ground with an apparently broken wing in order to induce the four-footed enemy to follow, and thus to give time for the young brood to disperse and hide themselves. The difficulty here, of course, is to understand how the birds can have acquired the idea of pretending to have a broken wing, for the occasions must be very rare on which any bird has seen a companion thus wounded followed by a carnivorous quadruped; and, even if such observations on their part were of frequent occurrence, it would be difficult to accredit the animals with so high a degree of reasoning power as would be required for them intentionally to imitate such movements. When I consulted

Mr. Darwin with reference to this difficulty, he gave me a provisional hypothesis by which it appeared to him that it might be met. He said that any one might observe, when a hen has a brood of young chickens and is threatened by a dog, that she will alternately rush at the dog and back again to the chickens. Now, if we could suppose that under these circumstances the mother bird is sufficiently intelligent to observe that when she runs away from the dog she is followed by the dog, it is not impossible that the maternal instinct might induce her to run away from a brood in order to lead the dog away from it. If this happened in any cases, natural selection would tend to preserve those mother birds which adopted this device. I give this explanation as the only one which either Mr. Darwin or myself has been able to suggest. It will be observed, however, that it is unsatisfactory, inasmuch as it fails to account for the most peculiar feature of the instinct—I mean the trailing of the apparently wounded wing.

The instinct of migration furnishes another case of special difficulty, but as I have no space to dwell upon the sundry questions which it presents for solution I shall now pass on to the last of the special difficulties which most urgently call for consideration. The case to which I refer deserves, I think, to be regarded as the most extraordinary instinct in the world. There is a species of wasp-like insect, called the Sphex. This insect lays its eggs in a hole excavated in the ground. It then flies away and finds a spider, which it stings in the main nerve-centre of the animal. This has the effect of paralyzing the spider without killing it. The sphex then carries the now motionless spider to its nursery, and buries it with the eggs. When the eggs hatch out, the grubs feed on the paralyzed prey, which is then still alive and therefore quite fresh, although it has never been able to move since the time when it was buried. Of course the difficulty here is to understand how the sphex insect can have acquired so much anatomical and physiological knowledge concerning its prey as the facts imply. We might indeed suppose, as I in the first instance was led to suppose, that, the sting of the sphex and the nerve-centre of the spider being both organs situated on the median line of their respective possessors, the striking of the nerve-centre by the sting might in the first instance have been thus accidentally favoured, and so have supplied a basis from which natural selection could work to the perfecting of an instinct always to sting in one particular spot. But more recently the French entomologist, M. Fabre, who first noticed these facts with reference to the stinging of the spider, has observed another species of sphex which preyed upon the grasshopper, and, as the nervous system of a grasshopper is more elongated than the nervous system of a spider, the sphex in this case has to sting its prey in three successive nerve-centres in order to induce paralysis. Again, still more recently, M. Fabre has found another species of sphex, which preys upon a caterpillar, and in this case the animal has to sting its victim in nine successive nerve-centres. On my consulting Mr. Darwin in reference to these astonishing facts, he wrote me the following letter:—

> I have been thinking about Pompilius and its allies. Please take the trouble to read on perforation of the corolla, by Bees, p. 425, of my 'Cross-fertilization,' to end of chapter. Bees show so much *intelligence* in their acts, that it seems not improbable to me that the progenitors of Pompilius originally stung caterpillars and spiders, &c., in any part of their bodies, and then observed by their intelligence that if they stung them in one particular place, as between certain segments on the lower side, their prey was at once paralyzed. It does not seem to me at all incredible that this action should then become instinctive, i. e. memory transmitted from one generation to another. It does not seem necessary to suppose that, when Pompilius stung its prey in the ganglion, it intended, or knew, that its prey would keep long alive. The development of the larva may have been subsequently modified in relation to its half dead, instead of wholly dead prey; supposing that the prey was at first quite killed, which would have required much stinging. Turn this over in your mind, &c.

I confess that this explanation does not appear to me altogether satisfactory, although it is no doubt the best explanation that can be furnished on the lines of Mr. Darwin's theory.

In the brief space at my disposal, I have endeavoured to give an outline sketch of the main features of the evidence which tends to show that animal instincts have been slowly evolved under the influence of natural causes, the discovery of which we owe to the genius of Darwin. And, following the example which he has set, I shall conclude by briefly glancing at a topic of wider interest and more general importance. The great chapter on Instinct in the *Origin of Species* is brought to a close in the following words:—

> Finally it may not be a logical deduction, but to my imagination it is far more satisfactory to look at such instincts as the young cuckoo ejecting its foster-brothers, ants making slaves, the larvae of ichneumonidae feeding within the live bodies of caterpillars, not as specially endowed or created instincts, but as small consequences of one general law leading to the advancement of all organic beings, namely, multiply, vary, let the strongest live, and the weakest die.

This law may seem to some, as it has seemed to me, a hard one—hard, I mean, as an answer to the question which most of us must at some time and in some shape have had faith enough to ask, 'Shall not the Judge of all the earth do right?' For this is a law, rigorous and universal, that the race shall always be to the swift, the battle without fail to the strong; and in announcing it the voice of science has proclaimed a strangely new beatitude—Blessed are the fit, for they shall inherit the earth. Surely these are hard sayings, for in the order of nature they constitute might the only right.

But, if we are thus led to feel a sort of moral repugnance to Darwinian teaching, let us conclude by looking at this matter a little more closely, and in the light that Darwin himself has flashed upon it in the short passage which I have quoted.

Eighteen centuries before the publication of this book—the *Origin of Species*—St. Paul had said, in words as strong as any that have been used by the Schopenhauers and Hartmanns of to-day, 'the whole creation groaneth in pain and travail.' Therefore we did not need a Darwin to show us this terrible truth; but we did need a Darwin to show us that out of all the evil which we see at least so much of good as we have known has come; that if this is a world of pain and sorrow, hunger, strife and death, at least the suffering has not been altogether profitless; that, whatever may be 'the far-off divine event to which the whole creation moves,' the whole creation, in all its pain and in all its travail, is certainly moving, and this in a direction which makes, if not for 'righteousness,' at all events for improvement. No doubt the origin of evil has proved a more difficult problem to solve than the origin of species; but, thus viewed, I think that the Darwinian doctrine deserves to be regarded as in some measure a mitigation of the difficulty; certainly in no case an aggravation of it. I do not deny that an immense residuum of difficulty remains, seeing that, so far as we can judge, the means employed certainly do not appear to be justified by the ends attained. But even here we ought not to lose sight of the possibility that, if we could see deeper into the mystery of things, we might find some further justification of the evil, as unsuspected as was that which, as it seems to me, Darwin has brought to light. It is not in itself impossible—perhaps it is not even improbable—that the higher instincts of man may be pointing with as true an aim as those lower instincts of the brutes which we have been contemplating. And, even if the theory of evolution were ever to succeed in furnishing as satisfactory an explanation of the natural development of the former as it has of the natural development of the latter, I think that the truest exponent of the meaning—as distinguished from the causation—of these higher instincts would still be, not the man of science, but the poet. Here, therefore, it seems to me that men of science ought to leave the question of pain in Nature to be answered, so far as it can be answered, by the general voice of that humanity which we all share, and which is able to acknowledge that at least its own allotment of suffering is not an unmitigated evil.

For clouds of sorrow deepness lend,
  To change joy's early rays,
And manhood's eyes alone can send
  A grief-ennobled gaze.

While to that gaze alone expand
  Those skies of fullest thought,
Beneath whose star-lit vault we stand,
  Lone, wondering, and untaught.

> We look before and after,
>   And pine for what is not,
> Our sincerest laughter
>   With some pain is fraught.

Yet still—

> Our sweetest songs are those that tell of saddest thought.

III.

MAN AND BRUTE.

I SHALL assume it as established that the principles of evolution have been shown to apply to the phenomena of mind as we find them presented in the lower animals; so that throughout the whole range of the animal kingdom, with the exception of man, we have satisfactory evidence of these phenomena having all been due to processes of a natural and continuous development, the causation of which is now in a large measure ascertained.

Starting, then, from this position, I desire to render a brief epitome of the leading points with regard, first, to the fact of 'mental evolution in man,' and, secondly, to the principles which, in this case, as in the case of the lower animals, have probably been concerned in the process. And here, I think, it is not too much to say that we have a problem which is not merely the most interesting of those that have fallen within the scope of my own work, but perhaps the most interesting that has ever been submitted to the contemplation of our race. If it is true that 'the proper study of mankind is man,' assuredly the study of nature has never before reached a territory of thought so important in all its aspects as that which, in our own generation, it is now for the first time approaching. After centuries of intellectual conquest in all regions of the phenomenal universe, man has at last begun to find that he may apply in a new and most unexpected manner the adage of antiquity, 'Know thyself.' For he has begun to perceive a strong probability, if not an actual certainty, that his own living nature is identical in kind with the nature of all other life, and that even the most amazing side of that nature—nay, the most amazing of all things within the reach of his knowledge—the human mind itself—is but the topmost inflorescence of one mighty growth, whose roots and stem and many branches are sunk in the abyss of planetary time.

The problem, therefore, which in this generation has now, for the first time, been presented to human thought is the problem of how this thought itself has come to be. A question of the deepest importance to every system of philosophy has been raised by the study of biology, and it is the question whether the mind of man is essentially the same as the mind of the lower animals, or, having had, either wholly or in part, some other mode of origin, is essentially distinct, differing not only in degree, but in kind, from all other types of psychical existence. Now, seeing that upon this great and deeply interesting question opinions are now much divided, even among those most eminent in the walks of science who agree in accepting the principles of evolution as applied to explain the corporeal constitution of man and the mental constitution of the lower animals, it is evident that the question must be a large one. How large it is, and into what matters of intricacy it leads, I need not here wait to show. I merely wish to observe that it is impossible to do it justice within the limits of a single article, and therefore that in this brief *résumé* of my own investigations concerning it I shall avoid all side issues and matters of technical detail.

First, then, let us consider the question on purely *a priori* ground. In accordance with our original assumption, the process of organic and of mental evolution has been continuous throughout the whole region of life and of mind, with the one exception of the mind of man. On grounds of a very large analogy, therefore, we should deem it antecedently improbable that the process of evolution, elsewhere so uniform and ubiquitous, should be interrupted at its terminal phase; and I think that, looking to the very large extent of the analogy, this antecedent presumption is really so considerable that it could only be fairly counterbalanced by some very cogent and unmistakable facts, showing a difference between animal and human psychology so distinctive as to render it in the nature of the case virtually impossible that the one could ever have graduated into the other. This I posit as the first consideration.

Next, still restricting ourselves to the *a priori* aspect of the matter, it is unquestionable that human psychology in the case of every individual human being presents to actual observation a process of gradual development, or evolution, extending from infancy to manhood; and that in this process, which begins at a zero level of mental life and may culminate in genius, there is nowhere and never observable a sudden leap of progress, such as the passage of one order of psychical being into another distinct in kind might reasonably be expected to show. Therefore, it is a matter of observable fact that, whether or not human intelligence differs from animal in kind, it certainly admits of gradual development from a zero level; and to this we must add that, so long as it is passing through the lower phases of that development, it assuredly ascends through a scale of mental faculties which are *pari passu* identical with those that are permanently presented by the psychological species of the animal kingdom. These facts, which I present as a second consideration, tend still further, and I think most strongly, to increase the force of the antecedent presumption against the process of evolution having been discontinuous in the region of mind.

Again, it is likewise a matter of actual observation that in the history of our race, as recorded in documents, traditions, antiquarian remains, and flint implements, the intelligence of the race has been subject to a steady process of gradual development—a general fact which admits of any amount of special corroboration by comparing the psychology of existing savages, where the process of evolution in the past has not been so rapid or has in part been arrested, with that of civilized man. This is the last consideration that I shall adduce of the *a priori* kind, and its force consists in the fact of its proving that if the process of mental evolution was interrupted between the anthropoid apes and primitive man it must again have recommenced with primitive man, and since then have continued as uninterruptedly in the human species as it previously did in the animal species. This, to say the least, upon the face of the indisputable facts, or from a merely antecedent point of view, appears to me a highly improbable supposition. At all events, it certainly is not the kind of supposition which men of science are disposed to regard with favour elsewhere; for a long and arduous experience has taught men of science that the most helpful kind of supposition which they can bring with them into their investigations of nature is that kind of supposition which recognizes in nature the principle of continuity.

Taking, then, all these *a priori* considerations together, they must, in my opinion, be fairly held to make out a very strong prima facie case in favour of the view that there has been no interruption of the developmental process in the course of psychological history, but that the mind of man, like the mind of animals, and, indeed, like everything else in organic nature, has been evolved. For these considerations show, not only that on analogical grounds any such interruption must be held as in itself improbable; but, also, that the human mind unquestionably admits of having been slowly evolved from the zero level, seeing that in every individual case, and during many past millenniums in the history of our species, the human mind actually does and has undergone the process in question.

In order to overthrow so immense a presumption as is thus erected on *a priori* grounds, the psychologist must fairly be called upon to supply some very powerful considerations of an *a posteriori* kind, tending to show that there is something in the constitution of the human mind which renders it impossible, or, at all events, exceedingly difficult, to imagine that it can have a genetic relation to mind of lower orders. I shall, therefore, now proceed to consider, as impartially as I can, the arguments which have been adduced on this side of the question.

The theory that animals are unconscious machines need not detain us, for no one at the present day is likely to defend it. Again, the distinction between human and brute psychology, which has always been taken, more or less, for granted, viz., that the one is rational and the other not, may similarly be set aside, if we understand by 'rational' merely the power of drawing inferences from observations. That there is no distinction of this kind to be made between men and animals I hold to be abundantly proved by the numberless instances of the display of rationality by brutes—rationality, I mean, in the only strict and accurate sense of the term just explained. Of course the faculty of drawing inferences from observations is immensely more developed in man than it is in any brute, but with this point we are not now concerned.

Again, the theological distinction between the man and the brute may be passed over, seeing that it rests upon a dogma with reference to which scientific inquiry has no point of legitimate contact. Whether or not the conscious part of man differs from the conscious part of brutes in being immortal, and whether or not the 'spirit' of the one differs from the 'soul' of the other in any particulars of kind, dogma itself must hold that science has no voice in determining. For, from the nature of the case, any information of a positive kind relating to these matters can only be expected to come by way of a revelation; and, therefore, however widely science and dogma may differ on other points, they are at least agreed upon this one: if man has a 'spirit' which differs thus from the 'animal soul,' Christianity and Philosophy alike proclaim that only by a Gospel could the fact of this 'life and immortality be brought to light[1].'

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[1] I neglect to consider the view of Bishop Butler, and of others

Aristotle and Buffon held that brutes differ from man in having no power of mental apprehension. This dictum appears to me unquestionably opposed to all the facts of observation, and may be sufficiently met by the remark of Jurèau de la Malle: 'Si les animaux n'étaient pas susceptibles d'apprendre des moyens de se conserver, les espèces se seraient anéanties.'

Locke maintained, and he has been followed by many writers both in psychology and general literature, that the mind of the brute differs essentially from that of the man in not being able to form abstract ideas. Now, it must be observed that Locke here restricts the term abstraction to that higher manifestation of the faculty which consists in thinking about an abstraction as an abstraction. I cannot find that he denies to animals the power which they unquestionably possess of forming general ideas of qualities as apart from any particular objects in which the qualities may inhere. A dog, for instance, like a young child, has a general idea of hot and cold, good-for-eating and bad-for-eating, &c., although we have no evidence to show that he ever thinks about this idea as an idea, or sets the idea itself before his mind as an object of contemplation. To me, therefore, it appears that Locke, when properly understood, has here hit the nail upon

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who have followed him, that animals may have an immortal principle as well as men, for this view serves to identify, and not to separate, the two orders of mind.

the head. The one great distinction, and indeed the only one which can be shown to obtain between the two orders of mind in question, consists in the power which the human mind displays, not merely of forming abstract ideas of qualities as apart from particular objects, but of thinking about these abstractions afterwards as abstractions. This is the initial or basal distinction. But, narrow at first as the space included between two lines of rail at their point of divergence, we have here the beginning of a difference which is destined to end at the opposite poles of mind. For, by a continuous advance along the same line of development, the human mind (we may see the process exemplified in the psychogenesis of every child) is enabled to think about abstractions of its own making, which are more and more remote from the sensuous perceptions of concrete objects; it can unite these abstractions into an endless variety of ideal combinations; these, in turn, may become elaborated into ideal constructions of a more and more complex character; and so on, till we arrive at the full powers of introspective thought, of which we are each one of us directly cognizant.

This, then, I take to be the only distinction that can be shown to obtain between the two orders of mind. How is it to be accounted for? How are we evolutionists to explain the fact that man alone of animals appears to present the power of representative thought, and thus to surpass the brute creation in the mental part of his being, as far as the mind of a Newton surpasses that of an infant about two years old?

I may take it for granted that all the emotional and intellectual ingredients of animal psychology are identical with those of human, so far as they go. In other words, it is only an additional or superadded growth, prodigious though it be, with which we are at present concerned. Now, the late George Henry Lewes has shown with much lucidity that in animals, as in ourselves, there is what he happily terms a 'logic of feelings.' That is to say, by constant converse with the circumstances of our life, we acquire a logic, or grouping according to laws, of the presentative processes of the mind, no less than of the representative; the former processes being those which are concerned in perception, and the latter those which are concerned in reflection or thought. Thus, for instance, to feel cold, and to think of feeling cold, are two very different acts of mind; yet the categories of mental life to which they severally belong are alike under the sway of a 'logic.' And similarly with animals. Whether or not they are able in any measure to reflect, or think about their own thoughts, there is no question that they are able to adapt their actions to circumstances, or that, like ourselves, they have a logic of feelings.

The logic of signs, at any rate in its higher development, has exclusive reference to the representative faculties, and is first evoked by those exigencies of life which render necessary or desirable the communication of ideas. The more numerous, abstract, and compound the ideas become, the more necessity there is for a corresponding development of the sign-system, whereby alone they admit of being expressed. But this is not all. For, on the other hand, each advance in the development of a sign-system, although primarily evoked for the purpose of communicating ideas already present, afterwards reacts upon the structure of ideation in which it arose, in such wise as to advance this structure one further stage in *its* development. And so, by continuous action and reaction, the logic of thought and the logic of signs mutually assist each other's development.

Take, for instance, the case of spoken language, which is the system of signs most generally in use among all the races of mankind. A very little reflection is enough to show of how immense a service are verbal signs as instruments of thought. By giving to an abstract idea a name, we are able, as it were, mentally to handle it, to compound it with other symbolical abstractions of the same kind, and so on till we arrive at verbal symbols of more and more complex qualities, as well as of conception further and further removed from immediate perception. Words are thus like the steps of a ladder, by the help of which we climb into higher and higher regions of abstraction; they are also like coins or bank-notes, into which we manage to condense a large amount of that value which we term meaning; or, to use a still closer analogy, they are like the symbols employed by the mathematician, which may contain in an easily manipulated form the results of a long calculation, no part of which could have been conducted but for the use of other symbols of the same kind. So that, to put the matter briefly, we may say, with Max Müller, that the growth of thought and language is coral-like; each generation of living thoughts secretes around itself the staple forms of words, which in turn serve as the basis for a further generation of thoughts.

Thus it seems to me—and I am not aware that any writer of note has ever ventured to question the view—that, given the faculty of speech, in however rudimentary a degree, and we have given the germ of that difference between the mind of man and the mind of brutes which may proceed, under suitable conditions as to social requirements, &c., to develop into any conceivable degree of divergent excellence. The only question, therefore, with which as evolutionists we are here confronted is, Why has man alone of animals been gifted with the *Logos?*

To answer this question we must first consider in what the essence of the *Logos* consists. Analysis shows that it consists in the power of predication, or of making a proposition, which is the expression of the power of forming a judgement. Thus far, men of all schools of thought are in agreement, even Mr. Mivart conceding that 'if the brute could think "is" man and brute would be brothers.' I conceive, then, that the only question before us is to explain the possible evolution of the power of predication.

Let it first be remembered that speech in all its forms is nothing more than a highly elaborated system of signs, and that, where adequate intelligence is already present, propositions admit of being made with quite as much distinctness and quite as much rationality by any other comparably elaborated system of signs as is the case, for instance, with the gesture-language of deaf-mutes or of the American Indians. Next let it be remembered that the germ of the sign-making faculty occurs among animals at least as far down in the scale as the ants, and that in all the higher vertebrata it is capable of development up to a very considerable level. Pointer dogs make gesture signs, the meaning of which they well understand; terriers will 'beg' for food; cats will pull at one's dress to lead one to their kittens in trouble; and a hundred other instances might be given. It is true that in none of these instances have we any evidence of predication, properly so called. But we have the germ of it. And when we have an animal sufficiently intelligent intentionally to translate its logic of feelings into a logic of signs for the purpose of communication we have an animal which, in effect, is making a proposition, although it may not know or think about the proposition as a proposition. When a cat or a dog pulls one's dress to lead one to the kittens or puppies in need of assistance, the animal is behaving in the same manner as a deaf-mute might behave when invoking assistance for a friend. That is to say, the animal is translating the logic of feelings into the logic of signs, and, so far as this particular action is concerned, it is psychologically indistinguishable from that which is performed by the deaf-mute; for, under the circumstances supposed, the deaf-mute does not wait to formulate any definite proposition even in his own mind; his only feeling is, 'Come, come,' and this is directly translated into a gesture sign.

Now, if among animals we thus have, as it were, the protoplasm of the sign-making faculty, it does not seem to me so very hard to understand how it might, under suitable conditions, become organized into the faculty of predication. The quadrumana habitually employ vocal signs as well as gestures whereby to express their emotions and the comparatively simple logic of their feelings. Let us, then, try to imagine an anthropoid ape somewhat more intelligent than the remarkable chimpanzee which has recently been brought to the Zoological Gardens of London, and which in respect of intelligence, as well as hairlessness and carnivorous habits, is perhaps the most human-like of these animals hitherto observed[1]. It does not seem to me very difficult to imagine that such an animal should extend the vocal signs which it habitually employed in the expression of its emotions to the conventional naming of a few familiar objects, such as food, child, &c. This, indeed, is no more than we find to be the case with a much less intelligent animal, viz. the parrot, which in many cases certainly uses vocal signs as names, whether these vocal signs are words the meaning of which it has been taught, sounds imitative of those made by the objects named, or, as is sometimes the case, wholly arbitrary, such as a peculiar squeak to signify a nut. Whether this nominative stage of language in the ape was first reached by articulation, or, as is more probable, by vocal sounds of other kinds, and gestures, is immaterial. In either case the advance of intelligence which would thus have been secured would in time have reacted upon the sign-making faculty, and so have led to an extension of the vocabulary, both as to sounds and gestures. Sooner or later the vocal signs, assisted by gestures, and even leading to a gradual advance of intelligence, would have become conventional, and so, in the presence of suitable anatomical conditions, articulate. The next step would have been the conventional naming of familiar qualities, such as sweet, bitter, and so on. This, be it observed, does not imply any very great advance upon the naming of objects by vocal or gesture signs; but yet it brings us to the very borders of predication. For, if once the name of an object and the name of a quality belonging to that object are used in apposition, the copula is latent in thought, and only requires a further advance of intelligence itself to become an object of thought.

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[1] The carnivorous habits of this animal, which is a new variety, are most interesting. It is surmised that in its wild state it must live upon birds, but in the Zoological Gardens it is found to show a marked preference for cooked meat over raw. It dines off broiled mutton chops, the bones of which it picks with its fingers and teeth, being afterwards careful to clean its hands. It mixes a little straw with the mutton as we mix vegetables, and after dinner takes a dessert of fruits.

Such, I believe, were the steps by which the faculty of predication was reached, and the bridge between the brute and the man constructed. Once this bridge was formed, all subsequent generations of intellect were free to roam over the hitherto unoccupied regions of possibility thus opened up; conscience, religion, sense of beauty, and all other products of the higher intelligence of man being but the natural result of the conditions which, in converse with its environment, that intelligence has itself created.

IV.

MIND IN MEN AND ANIMALS.

I HAVE in the foregoing essay endeavoured to sketch the lines through which the human mind has probably been evolved from minds of lower types. *My argument was that up to a certain* point the psychology of man runs parallel with that of animals; emotions, instincts, and reason all corresponding each to each in the two orders of mind so far as they are common to both; it being, therefore, only an unparalleled growth in certain lines in the psychology of man that the evolutionist has to explain. This unparalleled growth, I further argued, might be shown to arise from a gradual development of the sign-making faculty, as this undoubtedly occurs in animals. That is to say, in animals as in ourselves, there is obviously a 'logic of feelings,' and in them also to a certain extent there is obviously the power of translating this logic of feelings into the 'logic of signs.' Usually the signs employed are those of tone and gesture; but in the only animals that happen to possess the power of articulation, the talking birds, I have evidence to show that the signs employed for the purpose of communicating desires and ideas of objects, qualities, and actions, may be articulate. In what respect, then, it will be asked, does the mind of a parrot differ from the mind of a man? The bird has instincts, emotions, and a faculty of ratiocination, all the same in kind as those that obtain in ourselves; while in its power of translating the logic of its feelings into a logic of articulate signs the bird further presents (in a rudimentary stage of development, indeed, but none the less of like kind) the faculty of the *Logos*. Given these things, and all psychologists would be agreed that the high powers of abstraction that are the only distinctive features of the human mind might very probably have been developed by the mutual influence of language and thought.

In what respect, then, does the mind of a parrot differ from the mind of a man? The difference consists in the power of predication. An intelligent parrot is able to denominate an object or a quality; it is not able to predicate the quality as belonging to the object. In other words, the nominative stage of even spoken language does not extend to the power of making a proposition. At this stage of spoken language, words are nothing more than vocal gestures. A particular word, or a particular phrase, is learned by association, as the appropriate designation of a particular object, quality, action, or desire; but there is no power of spontaneously forming new sentences. At this stage in the evolution of language, whether in the parrot or in the child, words stand as signs that are stereotyped into special phrases, wherewith to signify particular things or states that the talker has previously associated with them; there is as yet no power of handling words as movable types wherewith to construct a proposition *de novo*. In order to pass from the nominative to the predicative stage of language or sign-making, two things are requisite. In the first place, the talker must have a general idea of beings in the abstract, else he could not supply the essential part of a proposition, the copula. In the next place, the talker must have a general idea of his own personality as distinct from that of all other beings, else he could not supply the essential meaning of a proposition, a judgement. When we make a proposition, we not only affirm a truth, but we affirm a truth perceived as true. We not only know that the grass is green (an animal knows this), but in predicating the greenness of the grass we prove that our knowledge is itself a matter of knowledge. We know that we know that the grass is green. This power of knowledge to know itself arises from the power that the human mind displays of introspection, or of turning inward upon itself, so as to make some of its states objective to others. And this power presupposes the faculty of self-consciousness, or the faculty of separating in thought the *ego* from the *non-ego*. Thus, in order to understand fully the probable genesis of predication, it is needful to consider the probable genesis of self-consciousness.

My proposition in this paper will be that, given the protoplasm of the sign-making faculty so far organized as to have reached the nominative stage of language, and given also the protoplasm of judgement so far organized as to have reached the stage of stating a truth (the mind not yet being sufficiently developed to be conscious of itself, and therefore not able to state to itself a truth as true), by the confluence of these two protoplasmic elements an act of fertilization is performed, such that the subsequent processes of mental organization proceed apace, and soon reach the stage of differentiation between subject and object. In all that is to follow I am in no way concerned with the philosophy of this change, but only with its history. On the side of its philosophy I am in complete agreement with the most advanced idealist, and hold that in the datum of self-consciousness we each of us possess, not alone our only ultimate knowledge, or that which alone is 'real in its own right,' but likewise the only mode of existence that the human mind is capable of conceiving as existence, and therefore the *conditio sine qua non* to the possibility of an external world. With this aspect of the matter, however, I am not here concerned. Just as the functions of an embryologist are confined to tracing the mere history of developmental changes, and just as he is thus as far as ever from throwing any light upon the deeper questions of the how and the why of life, so in seeking to indicate the steps whereby self-consciousness has arisen from the

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lower stage of physical development I am as far as any one can be from throwing any light upon the intrinsic nature of that the probable genesis of which I am endeavouring to trace. It is as true to-day as it was in the days of Solomon, that 'as thou knowest not how the bones do grow in the womb of her that is with child, thou knowest not what is the way of the spirit.'

If it is only in man that self-consciousness is to be found, clearly it is only to man that we can look for any facts bearing upon the question of its evolution. And, inasmuch as it is only during the first years of infancy that a human being is destitute of self-consciousness, the statement just made implies that only in infant psychology need we seek for the facts of which we are in search.

It will, I suppose, be admitted that self-consciousness consists in paying the same kind of attention to inward psychical processes that is habitually paid to outward physical processes. It will be further admitted that in the mind of animals and in the mind of infants there is a world of images standing as signs of outward objects[1]; and that the only reason why these images are not attended to unless called up by the sensuous association of corresponding objects is because the mind is not yet able to leave the ground of such association, so as to move through the higher and more tenuous medium of introspective thought.

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[1] See the chapter on 'Imagination' in *Mental Evolution in Animals.*

Nevertheless, the images, in the case of the higher animals, are not restricted to the mere reproduction in memory of particular objects of sensuous perception; they admit of undergoing that amount of mental elaboration which entitles them to be termed simple concepts. Further, it is of still more importance to observe that of these ideal constructions a large constituent number have reference, not to objects of sense or to general qualities of such objects, but to the mental states of other animals. That is to say, the logic of feeling, even in animals, is enough to enable the mind to establish true analogies between its own states (although these are not yet the objects of separate attention, or of clear as distinguished from implied knowledge) and the corresponding states of other minds. I need not dwell upon this point, because I take it to be a matter of simple observation that animals habitually and accurately interpret the mental states of other animals, while they also well know that other animals are able similarly to interpret their mental states, as is best proved by their practising the arts of cunning, concealment, hypocrisy, &c. From these considerations we reach the general conclusion that intelligent animals recognize a world of ejects as well as a world of objects. Mental existence is already known to them ejectively, although, as may be conceded, never thought upon subjectively[1].

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[1] The mental states of one individual cannot be known to another individual, either objectively or subjectively; they are known by

It is important further to observe that at this stage of mental evolution the individual, whether an animal or an infant, so far realizes its own personality as to be informed by the logic of feelings that it is one of a kind. I do not mean that at this stage the individual realizes its own or any other personality as a personality, but merely that it recognizes the fact of its being one among a number of similar though distinct forms of life. Alike in conflict, rivalry, sense of liability to punishment or vengeance, &c., the outward truth is continually being borne in upon the mind of an animal that it is a separate personality, and this though the animal may never be able, even in the most shadowy manner, to think about itself as a personality. In this way arises what Chauncey Wright has termed an 'outward self-consciousness,' which differs from true self-consciousness only in the absence of any attention being directed upon the inward mental states. This outward self-consciousness is known to us all, even in adult life, it being but comparatively seldom that we pause in our daily activities to contemplate the mental processes of which these activities are the expression.

We have seen, then, that self-consciousness consists in paying the same kind of attention to inward psychical processes that is habitually paid

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a process of inferring their resemblance to one's own mental states. We eject our own mental states upon what is otherwise to us the blank screen of another mind.

to outward physical processes; that in the mind of animals and infants there is a world of images standing as signs of outward objects; that at this stage of mental evolution we have not merely simple concepts, but also the recognition of an ejective no less than of an objective world; and that here also we have the recognition of personality, as far as this is dependent upon 'outward self-consciousness,' or the consciousness of self as a feeling and active agent, apart from self as an object of thought.

Such being the conditions precedent to the rise of self-consciousness, we may next turn to the growing child for evidence of all subsequent stages in the gradual evolution of this faculty. All observers are agreed that, for a considerable time after a child is able to use words as expressive of ideas, there is no vestige of true self-consciousness. Even its own organism at a year old is not known to the child as a part of the self, or, more correctly, as anything related to feelings. Professor Preyer observed that his boy, when more than a year old, bit his own arm just as though it had been a foreign object. Later, when the 'outward self-consciousness,' already explained, has begun to be developed, we find that the child, like the animal, has now learned to associate its own organism with its own mental states, in such wise that it recognizes its own body as belonging in a peculiar manner to the self, so far as this is recognized by the logic of feelings. Next, the child begins to talk, and, as we might expect, the first translation of the logic of feelings into the logic of signs having reference to self reveals the fact that as yet there is no true or inward self-consciousness, but only the outward. As yet, the child has paid no attention to his own mental states, further than to feel that he feels them; and, in the result, we find that the child speaks of himself as an object, i. e., *in the third person, or by his proper name.* The change in the child's phraseology, from speaking of self as an object to speaking of self as a subject, does not usually take place till the third year. When it has taken place, we have definite evidence of true self-consciousness, though it is still in a rudimentary stage.

Let it now be observed that, long before any words are used indicative of even a dawning consciousness of self as self, the child has already advanced so far in its use of language as to frame implicit propositions. On this point I may adduce the impartial and highly competent testimony of Mr. Sully, who writes:—

> When a child of eighteen months, on seeing a dog, exclaims 'Bow wow,' or, on tasting his food, exclaims 'Ot' (hot), or, on letting fall his toy, says 'Dow' (down), he may be said to be implicitly framing a judgement: 'That is a dog,' 'This milk is hot,' 'My plaything is down.' . . . . The boy was first observed to frame a distinct judgement when nineteen months old, by saying 'Dit ki' (sister is crying).

Hence we see that a child expresses implicit judgement before there is any evidence of his presenting the faintest rudiment of true self-consciousness. 'Dit dow yu' is a proposition in every respect, save in the significant absence of the copula, which means that at this stage the mind is not able to state to itself as true a truth which it states to other minds. The child here perceives a certain fact, and expresses the perception in words in order to communicate information of the fact to other minds, just as an animal under similar circumstances will use a gesture or a vocal sign; but the child is no more able than the animal to think 'is,' or consciously to make to its own mind a statement that it makes to others.

Given this stage of mental evolution, and what follows? The child, like the animal, is supplied by its logic of feelings with a world of images standing as signs of outward objects, with an ejective knowledge of other minds, and with that kind of recognition of self as an active, suffering, and accountable agent which we have spoken of as outward self-consciousness But, over and above the animal, the child has at its command the more improved machinery of sign-making, which enables it to signify to other minds the fuller contents of its knowledge. Among these contents is the child's perception of the mental states of others as expressed by their gestures, tones, and words. These severally receive their distinguishing names, and so gain clearness and precision as ejective images of the corresponding states experienced by the child itself. 'Mamma pleased to me' would have no meaning as spoken by a child, unless he knew from his own feelings what is the state of mind that he thus ejectively attributes to another individual. Therefore we cannot be surprised to find that at the same age a child will also say 'Dodo pleased to mamma.' Yet it is evident that we are here approaching the borders of true self-consciousness. 'Dodo' is no doubt still speaking of himself in objective phraseology; but he has advanced so far in the interpretation of his own states of mind as clearly to name them, and so to fix these states before his mental vision as things that admit of being denoted by verbal signs.

Obviously the step from this to recognizing 'Dodo' as not only the object but also the subject of mental changes is not long. The mere fact of attaching verbal signs to inward mental states has the effect of focussing the attention upon those states; and when attention is thus habitually focussed we have supplied the only further condition required to enable the mind, through its memory of previous states, to compare its past with its present, and so to reach that idea of continuity among its own states in which the consciousness of self essentially consists.

V.

ORIGIN OF HUMAN FACULTY.[1]

HAVING been requested by the Council of the Neurological Society to read a paper on a recently published book of my own, for the purpose of raising a discussion on the psychological doctrines which are therein presented, I will begin by briefly stating the aim and scope of the book in question.

The title of the book is *Mental Evolution in Man*; but, as the work constitutes only the first member of a series which I intend to devote to this topic, its second or subsidiary title more accurately defines the limits of its subject-matter—namely, 'The Origin of Human Faculty.' The aim of this treatise is twofold. First, to meet upon their own ground those various writers—psychological and theological—who maintain that a great exception must be made in the case of the human mind to the otherwise uniform law of continuous evolution; and, secondly, to indicate the probable causes, and thus to trace the probable history, of the transition between the intelligence of the lower animals and the intelligence of man.

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[1] A paper read before the Neurological Society on Thursday, Feb. 28, 1889.

It appears to me that before the Neurological Society I may be allowed to adopt the first of these positions without argument; and will, therefore, assume that in some way or another the transition in question has taken place. On the basis of this assumption I shall be free to devote all the time at my disposal to a consideration of the probable causes, or method, of the transition. For this purpose it is needful to set out with a brief analysis of ideation.

If I look at any particular face now before me, I receive what is called a perception, or a percept, of that face. If I then close my eyes, or turn them away from that face, but still retain the memory of it before what Hamlet calls 'the mind's eye,' I have what is designated an image or an idea of the face which I had previously perceived. The idea which I should have in this case would be what Locke calls a Simple Idea—*that is to say, the idea of* a particular object, or the mere memory of a particular percept. But now suppose that before shutting my eyes I had taken a general survey of all the faces at present before me, I should then have what Locke calls a Compound Idea, or the idea of a face in general, as distinguished from my previous simple idea, or the idea of a single face in particular. It is of great importance to note that these compound ideas are created by a fusion of a number of individual percepts, and thus differ *from simple ideas in that they are something more* than the mere memories of particular percepts. It is needless to say that animals possess compound ideas as well as simple ideas. For instance, a dog has a compound idea of Man, as distinguished from his particular idea of Master. But, lastly, when we come to what Locke calls General or Abstract Ideas, we find, as he says, 'that which puts a perfect distinction betwixt man and brutes.' Wherein, then, consists the difference between a compound idea and a general idea? It consists, according to the unanimous agreement of nearly all writers, in the idea having been named by a word, or other sign, which is designedly used as the mark or symbol of that idea. For instance, like my dog, I have a compound idea of Man, and a simple idea of some particular man; but, unlike my dog, I can name the one by the general word Man, and the other by the particular word John. A compound idea, when thus named, becomes what is called a conception, or a concept. Now, it will be observed that this conceptual order of ideation differs entirely from the other two orders which we have just been considering, in that a symbol is substituted for the mental image, so that the symbol may be used instead of the image, whether or not the image is present to the mind—or, indeed, whether or not any equivalent image admits of being formed at all. Consequently, the mind is now enabled to deal with symbols of ideas without requiring to call up the ideas themselves as memories of perceptions. Consequently, also, the mind is thus enabled to quit the sphere of sense and rise to that of what is called abstraction; furnished with the wings of language, human thought can soar far beyond the possibilities of any ideas which could be suggested by merely sensuous experience.

It will be further observed that the psychological condition to thus naming ideas, so as intentionally to treat the names as symbols of the ideas—the psychological condition required for this is the presence of what is called Self-consciousness. Unless an agent is conscious of itself as a mental agent, and of its own ideas as ideas, it is clearly not in a position to bestow upon them names as names. The mind must be able, so to speak, to get outside of itself, in order to contemplate its own states as such, before it can name these states with the conscious intention of using the names as symbols. In other words, the mind must be capable of introspection; and this power of introspection it is that goes to constitute the one and only distinction between the human mind and mind of lower animals, whether we call this distinction the faculty of Self-consciousness, of Abstraction, of Reason, of *Logos*, or by any of the other terms which are habitually used to signify this unique power of a mind to turn in upon its own self and examine its own ideas.

Thus far psychologists of every school are agreed. But as a great deal of laxity has been displayed by responsible writers in the use of Locke's terms, and, moreover, as his intermediate division of compound ideas has been largely lost sight of, I have devised for this intermediate division what I think are more appropriate terms, viz. *Generic Ideas* or *Recepts*. Adopting, then, these terms, you will note that all ideas admit of being classified under one or other of three divisions—viz. Simple Ideas, Generic Ideas, and General Ideas; or, more briefly, Percepts, Recepts, and Concepts. Percepts and recepts are common to the lower animals and to man; but concepts belong to man alone. Moreover, while recepts are formed by an automatic fusion of percepts, without any intentional activity on the part of the mind itself, concepts can only be formed by the intentional activity of the mind in the act of naming a percept or a recept, for the purposes of symbolic abstraction. Thus, a recept is passively received into the mind, while a concept is actively conceived by it. For example, observation shows that water-fowl have one recept (or organized body of percepts) answering to water, and another recept answering to land. So has man. But, unlike the fowl, he is able to bestow on each of these recepts a name, and so to raise them both to the level of concepts. Now, in order to do this, he must be able to set his recept before his own mind as an object of his own thought; before he can bestow his conceptual names on these ideas, he must have cognized them as ideas. In virtue of this act of cognition, he has created for himself—and for purposes other than locomotion—a priceless possession; he has formed a concept.

Nevertheless, the concept which he has thus formed is an exceedingly simple one—amounting, in fact, to nothing more than the naming of some among the most habitual of his recepts, 'land' and 'water.' But it belongs to the nature of concepts that, when thus formed, they admit of being intentionally compared and grouped together into higher and higher concepts, which, in virtue of being successively-named, become further and further removed from the sphere of sensuous perceptions. Thus there arises a kind of algebra of recepts. Now, it is in this algebra of the imagination that all the higher work of ideation is accomplished; and throughout it depends on the power of a mind to contemplate its own ideas as such.

The difference between a mind which is capable only of receptual ideation, and a mind which is capable, even in the lowest degree, of conceptual ideation, is usually taken to depend on the absence in the one and the presence in the other of the faculty of Language. Therefore, it is here necessary to say a few words upon this subject.

The faculty of language is, in the largest signification of the term, the faculty of making signs. Now, there is no doubt that the lower animals present the germ of this faculty. A dog will bark significantly before a closed door as a sign to request that it shall be opened; a wise cat will pull one by one's clothes as a sign to come to her kittens if they are in danger; a parrot will depress its head as a sign to be scratched, and so forth.

Nay, a parrot will even use verbal signs with a correct appreciation of their meanings, as proper names, substantives, adjectives, and verbs [1]. Where, then, is the difference between this kind of sign-making, which we may call receptual sign-making, and the sign-making which is peculiar to man, and which alone is conceptual sign-making? The difference is broad and deep. It consists in the power which the human mind displays, as already explained, not only of naming its ideas, but of making one idea stand before another as itself an object of thought. In other words, a man is able to think about his own ideas as ideas. Not only, like a parrot, can he name a particular man John (in consequence of having heard that particular man called John, and therefore associating the name with the man), but he is able to think about this name as a name And similarly, in all other cases, the difference between naming a thing receptually by mere association, and naming a thing conceptually by intentional thought, is all the difference between knowing that thing and knowing that we know it. And the difference on the side of the talking or sign-making agent is all the difference between an agent that is conscious only, and an agent that is likewise self-conscious. For it is the faculty of self-consciousness which thus enables a mind to set one idea before another as an object of its own thought; by means of this faculty the mind is able, as it were, to stand outside of itself, and so to perceive objectively the ideas which are passing subjectively—and this just as independently as if it were regarding an external series of dissolving views. How it is that such a state of matters is possible, whereby a mind can thus, as it were, get outside of its own existence, and so regard its own ideas as objective to itself—this is the mystery of all mysteries, the bottomless abyss of personality. But, accepting the fact as a fact, all that we have at present to do is to note the enormous difference which the presence of this fact introduces with reference to the sign-making faculty. For it means that merely conscious or receptual sign-making is sign-making which is not thought about as such; while self-conscious or conceptual sign-making is sign-making that is thought about as such. Consequently, while a parrot can only learn words or phrases which are stereotyped in the frame-work of special associations, man, after having thus learnt his vocabulary, can afterwards use his words and phrases like movable types, whereby to convey any number of different meanings by changes of their relative positions. Thus there are names and names; names receptual and names conceptual. In short, it is his super-added faculty of self-consciousness that has made man *par excellence* the sign-making animal; and therefore what we have to do to-night is to consider the genesis of this faculty.

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[1] All such statements on matters of fact, here and elsewhere, rest upon evidence which is furnished in my book.

First of all, however, I should like to say something more about the sign-making faculty, as this occurs before the rise of self-consciousness—that is to say, in the brute and in the human infant.

I distinguish four grades of the sign-making faculty. First there is what may be called the *indicative stage*. Long before it can speak, the infant will express its simple desires by means of intentionally significant tones and gesture-signs, such as pointing to objects in connexion with which it desires something to be done. Here the infant is obviously at the same level of sign-making as the cat which pulls one's dress to signify 'come,' or the parrot which will depress its head to signify its desire to be scratched.

Next we find what I call the *denotative stage* of sign-making. Here names are bestowed receptually, or by special association, upon particular objects, qualities, actions, and states of feeling. This stage occurs in the child when it is first emerging from infancy, and is psychologically indistinguishable from that which obtains in the talking birds. Denotative names, then, are names which have been learnt by merely receptual association; they do not imply any self-conscious or conceptual thought.

Following upon the denotative stage is what I call the *connotative*. This consists in a receptual extension of the meaning of a name, from the thing which was at first denoted by that name, to other things which are seen to resemble it. Thus, for example, as M. Taine has remarked, a young child which has learnt the name *Bow-wow* for a house terrier will soon extend it to all other dogs, then to pictures of dogs, to images of dogs, to his elder brother when walking on hands and knees, and so on through ever-widening circles of connotative extension. Now I have observed that a parrot will do precisely the same. One of the birds which I kept under observation used to bark in imitation of a terrier in the same house. Soon the barking became the parrot's denotative name for the terrier, so that the bird would bark whenever it saw the terrier. After a time it ceased to do this, but would always bark when it saw any other dog. Thus the parrot resembled the child of which M. Taine speaks, in that it extended the significance of its name for a particular dog, so as to apply it to any other dog. Here, however, the connotative extension of the name ceased; the bird would not bark at pictures of dogs, no doubt because it was not intelligent enough to perceive the pictorial representations.

Lastly, there is what I call the *denominative stage* of sign-making, or the bestowal of a name consciously known as such. Here we arrive at what I mean by conceptual naming, and therefore this stage of sign-making cannot arise until the mind has attained to self-consciousness. Therefore, also, it only occurs in man, and first appears in the growing child between the second and third years. Then, of course, the child begins to predicate, or to arrange its names in the form of propositions.

Now, in connexion with our subject, it is of the highest importance to note, not only that the three first stages of the sign-making faculty are thus common to animals and human beings, but also that these three first stages advance very much further in the growing child than they ever do in any animal, even before the growing child attains to the fourth, or distinctively human, stage. In other words, even while still moving in the purely receptual sphere, the growing child becomes much more intelligent, and much more proficient in the art of making signs, than any animal. Although not yet a self-conscious agent, and therefore not yet having attained to conceptual thought, a child between two and three years of age has already distanced every animal in respect of its purely receptual intelligence. But observe, thus far no difference of kind can be alleged by our opponents, because to allege any difference of kind between one order of receptual intelligence and another would be to vacate their whole argument. This argument depends on the distinction between ideation as receptual and conceptual—or between an agent that is, and an agent that is not, self-conscious. But a child up to its third year is not a self-conscious agent. This is proved by the fact that it never employs words having any self-conscious implication, and never gives evidence of even in the lowest degree thinking about its own ideas as such. In short, it cannot be disputed that the respects in which the intelligence of a child between two and three years of age distances that of the most intelligent animal have reference only to a higher advance of receptual ideation; the ideation has not yet become conceptual, and therefore cannot be alleged by our opponents to differ from the ideation of an animal in kind. The higher degree of intelligence which is displayed by a child of this age must therefore be taken to consist in a higher development of receptual intelligence, just in the same way as a dog is more intelligent than a bird. In order to distinguish this higher degree of receptual intelligence, which only occurs in man, and in the growing child immediately precedes the first appearance of conceptual intelligence, I will call it *pre-conceptual* intelligence.

It is of importance to note how far this higher receptual, or pre-conceptual, intelligence can go, and therefore I will briefly consider the kind of language or sign-making (*a*) which leads up to it, and (*b*) by which it is expressed when attained.

The indicative stage of language in the infant is at first below that of the more intelligent animals. But very soon it becomes equal to that of the most intelligent. The child will then point to objects in connexion with which it desires something to be done, in just the same way as a dog will beg before a water-jug, &c. It will pull one's dress in the same way as a cat does to signify 'Come'; and, lastly, it will use its voice to make significant—though inarticulate—sounds, after the manner of all the more intelligent of the higher animals.

Thus far, then, the child is still moving in the same levels of receptual ideation as the higher animals. But very soon its receptual ideation begins to distance that of even the most intelligent animal: the ideation of the child has therefore entered upon what I call its pre-conceptual phase. From this point onward its gesture-signs become correspondingly more and more significant, so that in children who are late in beginning to talk it may develop into regular pantomime. But now note, it is impossible that as yet there can be any conceptual ideation, because as yet there are no names, and therefore an absence of so much as the condition to the performance of any act of introspective thought.

Thus much, then, for the indicative phase of language in the receptual and pre-conceptual levels of human ideation. Passing on now to the next, or denotative phase (which the indicative phase may largely overlap in children who are late in talking), we find that when a child first begins to use articulate signs it learns the use of them in just the same way as a parrot does; that is to say, it learns the name of particular objects, qualities, actions, and states by special association—in other words, receptually. So far, then, as the beginning of the denotative stage of language is concerned, there is no difference at all between the child and the parrot. Neither is there any difference with regard to the beginning of the connotative stage; for, as I have already said, a parrot will extend its denotative name for a particular dog to all other dogs the resemblance of which one to another it is able to perceive—just in the same way as a young child will extend its name of *Bow-wow* from a terrier to a mastiff. And, although the bird will not follow the child where the child takes the further step of extending the name from living dogs to pictures of dogs, this is plainly due to the intelligence of the bird not advancing far enough to perceive the resemblance of pictures to the objects which they are intended to represent. Many dogs, however, and certain monkeys are able to do this, and, therefore, if a dog or a monkey were able to articulate, there can be no doubt that the brute would follow the child through this further step in the connotative extension of a name. Indeed, when we remember the extraordinary degree in which monkeys are able to understand the meanings of words, as well as the extraordinary propensity which they show in the way of imitating the actions of mankind, there can be no question that, if it were not for the anatomical accident of monkeys being unable to articulate, they would follow a child through what would probably seem a surprising distance in the use of denotative names and receptually connotative words. 'The chimpanzee now at the Zoological Gardens, which I have taught to count as far as five, displays in a perfectly marvellous degree the power of understanding language—so that one can explain to her verbally what one wishes her to do, in just the same way as we explain this to an infant about eighteen months old. Therefore, if this animal had been able to articulate, there can be no doubt that it would answer us in the same way that a child answers us when first emerging from infancy.

But here we come to an important point in our comparison between the two cases. After a child does emerge from infancy, its receptual intelligence continues to grow; and it continues to grow until it has left far behind the receptual intelligence of any brute. That is to say, between the time that a child first parts company with the brute in the matter of sign-making, up to the time when it first begins to use denominative words, or words which are used with a true conceptual appreciation of their significance, there is an immensely large interval which is filled by advancing stages of receptual development. Before it has attained to even the earliest dawn of self-consciousness—and therefore before it has attained to the possibility of thinking about names as names, or of ideas as ideas—the child has made a prodigious advance in its receptual intelligence, and therefore in the sign-making whereby this intelligence expresses itself. Now, as already stated, in order to distinguish this large and important territory of ideation, which is occupied by the mind of a child between the time that its receptual intelligence parts company with that of the most intelligent animal, up to the time when it first reaches the truly conceptual or self-conscious intelligence of a human being, I call this intervening territory of ideation by the name pre-conceptual. Pre-conceptual ideation, then, is that order of higher receptual ideation which is not presented by any brute, but which is presented by the growing child between the time that its developing intelligence parts company with that of even the most intelligent animal, up to the time when the dawn of self-consciousness begins to convert this higher receptual ideation into ideation that is truly conceptual.

I will now briefly consider the kind of sign-making which is distinctive of this pre-conceptual stage of ideation. The child has now acquired a large number of denotative words, which it has learnt by special association to regard as significant of certain objects, qualities, actions, and states. Suppose, then, that it sees its little sister crying. Its denotative name for this sister is *Dit:* its denotative name for the action of crying is *Ki*. Now the object and the action which these two names severally denotate happen to occur together before the child's observation; by the mere force of special association, therefore, the child denotates them both simultaneously—that is to say, brings them into *apposition*. This apposition in consciousness of two habitual recepts with their corresponding denotations is thus effected *for* the child by what may be termed 'the logic of events': it is not effected *by* the child in the way of any intentional or self-conscious grouping of its ideas, such as goes to constitute the distinguishing feature of the logic of concepts. Therefore, when, on seeing its sister crying, the child says *Dit Ki*, although in one sense we may say that the child is making a proposition, in another and a stricter sense we must deny that this is a true proposition. The proposition, if so it may be called, is pre-conceptual, not conceptual: it is of the psychological kind that we might have expected a monkey to make, if a monkey had been able to pronounce denotative names as well as it can understand them. For the proposition is made by an agent which is not yet a self-conscious agent, and therefore cannot possibly have been thought about as a proposition. That is to say, it lacks the very element of conceptual or introspective thought on which our opponents rely as proving a difference of kind between the brute and the man. Therefore, without argumentative suicide, our opponents cannot afford to maintain that a pre-conceptual proposition of this kind is a genuine proposition, in the sense of being a proposition that implies for its construction any of the distinctively human powers of introspective or abstract thought.

Now, it is needless to say that at this age a child is incessantly making these pre-conceptual propositions; and, of course, the important thing to notice about them is that as yet they are not, and cannot possibly be, conceptual propositions. It is not until the child has attained to self-consciousness, and therefore is able, not only to denotate, but to denominate—not only to name, but to think the names, not only to make statements, but to contemplate its statements as such—it is not until the child has taken this further step that it has the peculiar quality of ideation on which our opponents rely for their psychological distinction between the brute and the man. No doubt these pre-conceptual propositions are strongly suggestive of a near approach to true or conceptual propositions: but the point is that as yet they do not present the very feature which it is necessary that they should present, if they are to conform to the distinction of kind between animal and human intelligence which our opponents have endeavoured to institute. They are always evoked by the external logic of events bringing into apposition objects, qualities, &c., the denotative names of which are called up in the child's mind by immediate association—and, therefore, are necessarily called up in apposition. Thus the apposition which here gives to the two denotative names the outward form of a proposition is, as I have before said, an apposition which is furnished *to* the child by the external logic of events; not an apposition which is formed *by* the child through any internal operations of introspective thought. So far, therefore, as any question of kind is concerned, it is manifestly impossible for our opponents to argue that these pre-conceptual propositions betoken anything further than the gesture-signs which characterize the earlier stages of a child's intelligence, and which, as we have before seen, serve to connect its growth with the indicative stage of sign-making as this occurs in the lower animals.

The whole issue, then, here becomes resolved into an inquiry touching the subsequent rise of self-consciousness in the child, or the appearance of the psychological condition to a child thinking about its own ideas as ideas—the psychological condition to its thinking about names as names, and therefore the psychological condition to its raising a merely pre-conceptual statement of a fact which it perceives into a conceptual statement of that fact with an introspective knowledge of it as a fact.

Now, in considering this final stage, or the rise of self-consciousness in the child, it is of importance to note that even the lower animals present some of the earliest psychological conditions to the subsequent appearance of self-consciousness in the more gifted intelligence of man. Thus, in the minds of brutes, as in the minds of men, there is a world of images or recepts; and this image world, even in brutes, displays a certain amount of internal activity, which is not wholly dependent on sensuous associations supplied from without. The phenomena of dreaming, hallucination, home-sickness, pining for absent friends, and so forth, amply demonstrate that in our more intelligent domesticated animals there may be an internal (though unintentional) play of ideation, wherein one image suggests another, this another, and so on, without the need of any immediate associations supplied from present objects of sense. Furthermore, receptual ideation of this kind is not restricted to the images of sense-perception, but is largely concerned with the mental states of other animals. That is to say, the logic of recepts, even in brutes, is sufficient to enable the mind to establish true analogies between its own subjective states and the corresponding states of other intelligences. Now, at this stage of mental evolution the individual—whether an animal or an infant—so far realizes its own individuality as to be informed by the logic of recepts that it is one of a kind, although of course it does not recognize either its own or any other individuality as such.

Nevertheless, there is thus given a rudimentary or nascent form of self-consciousness, which up to the stage that it reaches in a brute or an infant may be termed *receptual self-consciousness*, while in the more advanced stages, which it presents in young children who have just emerged from infancy and are therefore beginning to talk, it may be termed *pre-conceptual self-consciousness*. Pre-conceptual self-consciousness, then, is exhibited by all children after they have begun to talk, but before they begin to speak of themselves in the first person, or otherwise to give any evidence of realizing their own existence as such. Later on, when true self-consciousness does arise, the child of course is able to do this, and then only is supplied the condition *sine quâ non* to a reflection upon its own ideas—

hence to a knowledge of names as names, and so to a statement of truths as true. But long before this stage of true or conceptual self-consciousness is reached—whereby alone is rendered possible true or conceptual predication—the child, in virtue of its pre-conceptual self-consciousness, is able to make known its wants, and otherwise to communicate its ideas, by way of pre-conceptual predication, as I have previously shown. Now, if I had time, I could further show that the pre-conceptual self-consciousness, of which this is the expression, amounts to nothing more than a practical recognition of self as an active and feeling agent, without as yet any introspective recognition of that self as an object of knowledge.

Given, then, this stage of mental evolution, and what follows? The child, like the animal, is supplied by its logic of recepts with a world of images, standing as signs of outward objects; with a practical knowledge of processes going on in other minds; and with that kind of recognition of self as an active and suffering agent to which allusion has just been made. But, over and above the animal, the child has now at its command a much more improved machinery of sign-making, which, as we have before seen, is due to the higher evolution of its receptual ideation. Now, among the contents of this ideation is a better apprehension of the mental states of other human beings, together with a greatly increased power of denotative utterance, whereby the child is able to name receptually such mental states on the part of others as it thus receptually apprehends. These, therefore, severally receive their appropriate denotations, and so gain clearness and precision as images of the corresponding states experienced by the child itself. 'Mamma pleased to Dodo' would have no meaning as spoken by a child, unless the child knew from its own feelings what is the state of mind which it thus attributes to another. Hence we find that at the same age the child will also say, 'Dodo pleased to mamma.' Now, it is evident that we are here approaching the very borders of true or conceptual self-consciousness. The child, no doubt, is still speaking of itself in objective phraseology; but it has advanced so far in the interpretation of his own states of mind as clearly to name them, in the same way as he would name any external objects of sense-perception. Thus, he is enabled to fix these states before his mental vision as things which admit of being denoted by verbal signs, although as yet he has never thought about either the states of mind or his names for them as such, and, therefore, has not yet attained to the faculty of denomination. But the interval between denotation and denomination has now become so narrow that the step from recognizing 'Dodo' as not only the object, but also the subject of mental changes, is rendered at once easy and inevitable. The mere fact of attaching verbal signs to mental states has the effect of focussing attention upon those states; and, when attention is thus focussed habitually, there is supplied the only further condition which is required to enable a mind, through its memory of previous states, to compare its past with its present; and so to reach that apprehension of continuity among its own states wherein the full introspective consciousness of self consists.

In confirmation of this my general argument, I must now conclude by observing that, although the advance to true self-consciousness from lower grades of mental development is no doubt a very great and important matter, still it is not so great and important, in comparison with what this development is afterwards destined to become, as to make us feel that it constitutes any distinction *sui generis* —or even, perhaps, the principal distinction—between the man and the brute. For even when self-consciousness does arise, and has become fairly well developed, the powers of the human mind are still in an almost infantile condition. In other words, the first genesis of true self-consciousness marks a comparatively low level in the evolution of the human mind—as we might expect that it should, if its genesis depends upon, and therefore lies so near to, those precedent conditions in merely animal psychology to which I have assigned it. But, if so, does it not follow that, great as the importance of self-consciousness afterwards proves to be in the development of distinctively human ideation, in itself, or in its first beginning, it does not betoken any very perceptible advance upon those powers of pre-conceptual ideation which it immediately follows? There is thus shown to be even less reason for regarding the first advent of conceptual self-consciousness as marking a psychological difference of kind, than there would be so to regard the advent of those higher powers of conceptual ideation which subsequently—though as gradually—supervene between early childhood and youth. Yet no one has hitherto ventured to suggest that the intelligence of a child and the intelligence of a youth display a difference of kind.

I have condensed as much of my main argument as I have found to be possible within the limits of a paper. But, of course, it is needless to say that I am very far from having given the whole. In particular, I have omitted all reference to the latter portion of my treatise, which is concerned with the only direct evidence that we have of the earlier stages of mental evolution in the race. Nevertheless, although isolated and imperfect, this source of evidence is one of immense importance—standing, in fact, to the science of comparative psychology in very much the same relation as palaeontology stands to the science of comparative anatomy; since it serves, by a kind of fossil record, to mark a prehistoric development of ideation, which is curiously analogous to the geological record of a prehistoric development of organization. Moreover, the evidence thus furnished is of special value on account of its wholly independent character; it is throughout perfectly distinct from the psychological analysis on which we have hitherto been engaged. Doubtless you will already have perceived to what it is that I allude: it is to the independent, and, I venture to add, the overpowering, witness of Philology. The gradual evolution of articulate language has preserved for us a kind of palaeontological record of the gradual evolution of conceptual thought, with the result of showing that in the life-history of the human species, as in the life-history of the individual child, this conceptual thought derived its origin from these pre-conceptual levels of ideation which have already been occupying our attention. Although it is impossible for me now to give even an outline sketch of this argument from philology, I may conclude by quoting the last paragraph of my summary, in order to give you a general idea of the immense assistance which is thus rendered to the theory of evolution in the domain of human psychology.

Here, then, I bring to a close this brief and imperfect rendering of the 'Witness of Philology.' But, brief and imperfect as the rendering is, I am honestly unable to see how it is conceivable that the witness itself could have been more uniform as to its testimony, or more multifarious as to its facts—more consistent, more complete, or more altogether overwhelming than we have found it to be. In almost every single respect it has corroborated the results of our psychological analysis. It has come forward like a living thing, which, in the very voice of Language itself, directly and circumstantially narrates to us the actual history of a process the consistent steps of which we had previously inferred. It has told us of a time when as yet mankind were altogether speechless, and able to communicate with one another only by means of gesticulation and grimace. It has to us described the first articulate sounds in the form of sentence-words, without significance apart from the pointings by which they were accompanied. It has revealed the gradual differentiation of such a protoplasmic form of language into 'parts of speech,' and declared that these grammatical structures were originally the offspring of gesture-signs. More particularly, it has shown that, in the earliest phases of articulate utterance, pronominal elements, and even predicative words, were used in the impersonal manner which belongs to a hitherto undeveloped form of self-consciousness—primitive man, like a young child, having therefore spoken of his own personality in objective terminology. It has taught us to find in the body of every conceptual term a pre-conceptual core; so that, as the learned and thoughtful Garnett says, '*nihil in oratione quod non prius in sensu*' may now be regarded as an incontrovertible axiom. It has minutely described the whole of that wonderful aftergrowth of articulate utterance, through many lines of divergent evolution, in virtue of which all nations of the earth are now in possession, in one degree or another, of the god-like attributes of reason and of speech. Truly, as Archdeacon Farrar says, 'to the flippant and the ignorant, how ridiculous is the apparent inadequacy of the origin to produce such a result.' But here, as elsewhere, it is the method of evolution to bring to nought the things that are mighty by the things that are of no reputation; and, when we feel disposed to boast ourselves in that we alone may claim the

Logos, should we not do well to pause and remember in what it was that this our high prerogative arose? 'So hat auch keine Sprache ein Abstractum, zu dem sie nicht durch Ton und Gefühl gelangt wäre.' To my mind it is simply inconceivable that any stronger proof of mental evolution could be furnished than is furnished in this one great fact, by the whole warp and woof of the thousand dialects of every pattern which are now spread over the surface of the globe. We cannot speak to each other in any tongue without declaring the pre-conceptual derivation of our speech; we cannot so much as discuss the 'origin of human faculty' itself without announcing, in the very medium of our discussion, what that origin has been. It is to Language that my opponents have appealed; by Language they are hopelessly condemned.

VI.

MENTAL DIFFERENCES BETWEEN MEN AND WOMEN.

IN his *Descent of Man* Mr. Darwin has shown at length that what Hunter termed secondary sexual characters occur throughout the whole animal series, at least as far down in the zoological scale as the Articulata. The secondary sexual characters with which he is chiefly concerned are of a bodily kind, such as plumage of birds, horns of mammals, &c. But I think it is evident that secondary sexual characters of a mental kind are of no less general occurrence. Moreover, if we take a broad view of these psychological differences, it becomes instructively apparent that a general uniformity pervades them—that, while within the limits of each species the male differs psychologically from the female, in the animal kingdom as a whole the males admit of being classified, as it were, in one psychological species, and the females in another. By this, of course, I do not mean that there is usually a greater psychological difference between the two sexes of the same species than there is between the same sexes of different species: I mean only that the points wherein the two sexes differ psychologically are more or less similar wherever these differences occur.

It is probably due to a recognition of this fact that from the very earliest stages of culture mankind has been accustomed to read into all nature—inanimate as well as animate differences of the same kind. Whether it be in the person of Maya, of the pagan goddesses, of the Virgin Mary, or in the personifications of sundry natural objects and processes, we uniformly encounter the conception of a feminine principle co-existing with a masculine in the general frame of the Cosmos. And this fact, as I have said, is presumably due to a recognition by mankind of the uniformity as well as the generality of psychological distinction as determined by sex.

I will now briefly enumerate what appear to me the leading features of this distinction in the case of mankind, adopting the ordinary classification of mental faculties as those of intellect, emotion, and will.

Seeing that the average brain-weight of women is about five ounces less than that of men, on merely anatomical grounds we should be prepared to expect a marked inferiority of intellectual power in the former[1]. Moreover, as the general physique of women is less robust than that of men—and therefore less able to sustain the fatigue of serious or prolonged brain action—we should also on physiological grounds be prepared to entertain a similar anticipation. In actual fact we find that the inferiority displays itself most conspicuously in a comparative absence of originality, and this more especially in the higher levels of intellectual work. In her powers of acquisition the woman certainly stands nearer to the man than she does in her powers of creative thought, although even as regards the former there is a marked difference. The difference, however, is one which does not assert itself till the period of adolescence—young girls being, indeed, usually more acquisitive than boys of the same age, as is proved by recent educational experiences both in this country and in America. But as soon as the brain, and with it the organism as a whole, reaches the stage of full development, it becomes apparent that there is a greater power of amassing knowledge on the

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[1] This is proportionally a greater difference than that between the male and female organisms as a whole, and the amount of it is largely affected by grade of civilization—being least in savages and most

in ourselves. Moreover, Sir J. Crichton Browne informs me, as a result of many observations which he is now making upon the subject, that not only is the grey matter, or cortex, of the female brain shallower than that of the male, but it also receives less than a proportional supply of blood. For these reasons, and also because the differences in question date from an embryonic period of life, he concludes that they constitute 'a fundamental sexual distinction, and not one that can be explained on the hypothesis that the educational advantages enjoyed either by the individual man or by the male sex generally through a long series of generations have stimulated the growth of the brain in the one sex more than in the other.'

part of the male. Whether we look to the general average or to the intellectual giants of both sexes, we are similarly met with the general fact that a woman's information is less wide and deep and thorough than that of a man. What we regard as a highly cultured woman is usually one who has read largely but superficially; and even in the few instances that can be quoted of extraordinary female industry—which on account of their rarity stand out as exceptions to prove the rule—we find a long distance between them and the much more numerous instances of profound erudition among men. As musical executants, however, I think that equality may be fairly asserted.

In the matter of original work, as already observed, the disparity is most conspicuous. For it is a matter of ordinary comment that in no one department of creative thought can women be said to have at all approached men, save in fiction. Yet in poetry, music, and painting, if not also in history, philosophy, and science, the field has always been open to both[1]. For, as I will presently show, the disabilities under which women have laboured with regard to education, social opinion, and so forth, have certainly not been sufficient to explain this general dearth among them of the products of creative genius.

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[1] The disparity in question is especially suggestive in the case of poetry, seeing that this is the oldest of the fine arts which have come down to us in a high degree of development, that its exercise requires least special education or technical knowledge, that at no level of culture has such exercise been ostracized as unfeminine, that nearly all languages present several monuments of poetic genius of the first order, and yet that no one of these has been reared by a woman.

Lastly, with regard to judgement, I think there can be no real question that the female mind stands considerably below the male. It is much more apt to take superficial views of circumstances calling for decision, and also to be guided by less impartiality. Undue influence is more frequently exercised from the side of the emotions; and, in general, all the elements which go to constitute what is understood by a characteristically judicial mind are of comparatively feeble development. Of course here, as elsewhere, I am speaking of average standards. It would be easy to find multitudes of instances where women display better judgement than men, just as in the analogous cases of learning and creative work. But that as a general rule the judgement of women is inferior to that of men has been a matter of universal recognition from the earliest times. The man has always been regarded as the rightful lord of the woman, to whom she is by nature subject, as both mentally and physically the weaker vessel; and, when in individual cases these relations happen to be inverted, the accident becomes a favourite theme for humorists—thus showing that in the general estimation such a state of matters is regarded as incongruous.

But, if woman has been a loser in the intellectual race as regards acquisition, origination, and judgement, she has gained, even on the intellectual side, certain very conspicuous advantages. First among these we must place refinement of the senses, or higher evolution of sense-organs. Next we must place rapidity of perception, which no doubt in part arises from this higher evolution of the sense-organs—or, rather, both arise from a greater refinement of nervous organization. Houdin, who paid special attention to the acquirement of rapidity in acts of complex perception, says he has known ladies who were able, while seeing another lady 'pass at full speed in a carriage, to analyze her toilette from her bonnet to her shoes, and be able to describe, not only the fashion and quality of the stuffs, but also to say if the lace were real or only machine-made.' Again, reading implies enormously intricate processes of perception, both of the sensuous and intellectual order: and I have tried a number of experiments, wherein reading was chosen as a test of the rapidity of perception in different persons. Having seated a number of well-educated individuals round a table, I presented to them successively the same paragraph of a newspaper, which they were each to read as rapidly as they could, ten seconds being allowed for twenty lines. As soon as time was up I removed the paragraph, immediately after which the reader wrote down all that he or she could remember of it. Now, in these experiments, where everyone read the same paragraph as rapidly as possible, I found that the palm was usually carried off by the ladies Moreover, besides being able to read quicker, they were better able to remember what they had just read—that is, to give a better account of the paragraph as a whole. One lady, for example, could read exactly four times as fast as her husband, and could then give a better account even of that portion of the paragraph which alone he had had time to get through. For the consolation of such husbands, however, I may add that rapidity of perception as thus tested is no evidence of what may be termed the deeper qualities of mind—some of my slowest readers being highly distinguished men.

Lastly, rapidity of perception leads to rapidity of thought, and this finds expression on the one hand in what is apt to appear as almost intuitive insight, and on the other hand in that nimbleness of mother wit which is usually so noticeable and often so brilliant an endowment of the feminine intelligence, whether it displays itself in tact, in repartee, or in the general alacrity of a vivacious mind.

Turning now to the emotions, we find that in woman, as contrasted with man, these are almost always less under control of the will—more apt to break away, as it were, from the restraint of reason, and to overwhelm the mental chariot in disaster. Whether this tendency displays itself in the overmastering form of hysteria, or in the more ordinary form of comparative childishness, ready annoyance, and a generally unreasonable temper—

in whatever form this supremacy of emotion displays itself, we recognize it as more of a feminine than a masculine characteristic. The crying of a woman is not held to betray the same depth of feeling as do the sobs of a man; and the petty forms of resentment which belong to what is known as a 'shrew' or a 'scold' are only to be met with among those daughters of Eve who prove themselves least agreeable to the sons of Adam. Coyness and caprice are very general peculiarities, and we may add, as kindred traits, personal vanity, fondness of display, and delight in the sunshine of admiration. There is also, as compared with the masculine mind, a greater desire for emotional excitement of all kinds, and hence a greater liking for society, pageants, and even for what are called 'scenes,' provided these are not of a kind to alarm her no less characteristic timidity. Again, in the opinion of Mr. Lecky, with which I partly concur:

> In the courage of endurance they are commonly superior; but their passive courage is not so much fortitude which bears and defies as resignation which bears and bends. In the ethics of intellect they are decidedly inferior. They very rarely love truth, though they love passionately what they call 'the truth,' or opinions which they have derived from others, and hate vehemently those who differ from them. They are little capable of impartiality or doubt; their thinking is chiefly a mode of feeling; though very generous in their acts, they are rarely generous in their opinions or

in their judgements. They persuade rather than convince, and value belief as a source of consolation rather than as a faithful expression of the reality of things.

But, of course, as expressed in the well-known lines from *Marmion*, there is another side to this picture, and, in now taking leave of all these elements of weakness, I must state my honest conviction that they are in chief part due to women as a class not having hitherto enjoyed the same educational advantages as men. Upon this great question of female education, however, I shall have more to say at the close of this paper, and only allude to the matter at the present stage in order to temper what I feel to be the almost brutal frankness of my remarks.

But now, the meritorious qualities wherein the female mind stands pre-eminent are affection, sympathy, devotion, self-denial, modesty; long-suffering or patience under pain, disappointment, and adversity; reverence, veneration, religious feeling, and general morality. In these virtues—which agree pretty closely with those against which the apostle says there is no law—it will be noticed that the gentler predominate over the heroic; and it is observable in this connexion that when heroism of any kind is displayed by a woman the prompting emotions are almost certain to be of an unselfish kind.

All the aesthetic emotions are, as a rule, more strongly marked in women than in men—or, perhaps, I should rather say, they are much more generally present in women. This remark applies especially to the aesthetic emotions which depend upon refinement of perception. Hence feminine 'taste' is proverbially good in regard to the smaller matters of everyday life, although it becomes, as a rule, untrustworthy in proportion to the necessity for intellectual judgement. In the arrangement of flowers, the furnishing of rooms, the choice of combinations in apparel, and so forth, we generally find that we may be most safely guided by the taste of women; while in matters of artistic or literary criticism we turn instinctively to the judgement of men.

If we now look in somewhat more detail at the habitual display of these various feelings and virtues on the part of women, we may notice, with regard to affection, that, in a much larger measure than men, they derive pleasure from receiving as well as from bestowing: in both cases affection is felt by them to be, as it were, of more emotional value. The same remark applies to sympathy. It is very rare to find a woman who does not derive consolation from a display of sympathy, whether her sorrow be great or small; while it is by no means an unusual thing to find a man who rejects all offers of the kind with a feeling of active aversion.

Touching devotion, we may note that it is directed by women pretty equally towards inferiors and superiors—spending and being spent in the tending of children; ministering to the poor, the afflicted, and the weak; clinging to husbands, parents, brothers, often without and even against reason.

Again, purity and religion are, as it were, the natural heritage of women in all but the lowest grades of culture. But it is within the limit of Christendom that both these characters are most strongly pronounced; as, indeed, may equally well be said of nearly all the other virtues which we have just been considering. And the reason is that Christianity, while crowning the virtue of chastity with an aureole of mysticism more awful than was ever conceived even by pagan Rome, likewise threw the vesture of sanctity over all the other virtues which belong by nature to the feminine mind. Until the rise of Christianity the gentler and domestic virtues were nowhere recognized as at all comparable, in point of ethical merit, with the heroic and the civic. But when the ideal was changed by Christ—when the highest place in the hierarchy of the virtues was assigned to faith, hope and charity, to piety, patience and long-suffering, to forgiveness, self-denial and even self-abasement—we cannot wonder that, in so extraordinary a collision between the ideals of virtue, it should have been the women who first flocked in numbers around the standard of the Cross.

So much, then, for the intellect and emotions. Coming lastly to the will, I have already observed that this exercises less control over the emotions in women than in men. We rarely find in women that firm tenacity of purpose and that determination to overcome obstacles which are characteristic of what we call a manly mind. When a woman is urged to any prolonged or powerful exercise of volition, the prompting cause is usually to be found in the emotional side of her nature, whereas in man we may generally observe that the intellectual is alone sufficient to supply the needed motive. Moreover, even in those lesser displays of volitional activity which are required in close reading, or in studious thought, we may note a similar deficiency. In other words, women are usually less able to concentrate their attention; their minds are more prone to what is called 'wandering,' and we seldom find that they have specialized their studies or pursuits to the same extent as is usual among men. This comparative weakness of will is further manifested by the frequency among women of what is popularly termed indecision of character. The proverbial fickleness of *la donna mobile* is due quite as much to vacillation of will as to other unstable qualities of mental constitution. The ready firmness of decision which belongs by nature to the truly masculine mind is very rarely to be met with in the feminine, while it is not an unusual thing to find among women indecision of character so habitual and pronounced as to become highly painful to themselves—leading to timidity and diffidence in adopting almost any line of conduct where issues of importance are concerned, and therefore leaving them in the condition, as they graphically express it, of not knowing their own minds.

If, now, we take a general survey of all these mental differences, it becomes apparent that in the feminine type the characteristic virtues, like the characteristic failings, are those which are born of weakness; while in the masculine type the characteristic failings, like the characteristic virtues, are those which are born of strength. Which we are to consider the higher type will therefore depend on the value which we assign to brute force. Under one point of view, the magnificent spider of South America, which is large enough and strong enough to devour a humming-bird, deserves to be regarded as the superior creature. But, under another point of view, there is no spectacle in nature more shockingly repulsive than the slow agonies of the most beautiful of created beings in the hairy limbs of a monster as far beneath it in the sentient as in the zoological scale. And, although the contrast between man and woman is happily not so pronounced in degree, it is nevertheless a contrast the same in kind. The whole organization of woman is formed on a plan of greater delicacy, and her mental structure is correspondingly more refined; it is further removed from the struggling instincts of the lower animals, and thus more nearly approaches our conception of the spiritual. For even the failings of weakness are less obnoxious than the vices of strength, and

I think it is unquestionable that these vices are of quite as frequent occurrence on the part of men as are those failings on the part of women. The hobnailed boots may have given place to patent pumps, and yet but small improvement may have been made upon the overbearing temper of a navvy; the beer-shop may have been superseded by the whist-club, and yet the selfishness of pleasure-seeking may still habitually leave the solitary wife to brood over her lot through the small hours of the morning. Moreover, even when the mental hobnails have been removed, we generally find that there still remains what a member of the fairer sex has recently and aptly designated mental heavy-handedness. By this I understand the clumsy inability of a coarser nature to appreciate the feelings of a finer; and how often such is the case we must leave the sufferers to testify. In short, the vices of strength to which I allude are those which have been born of rivalry: the mental hide has been hardened, and the man carries into his home those qualities of insensibility, self-assertion, and self-seeking which have elsewhere led to success in his struggle for supremacy. Or, as Mr. Darwin says, 'Man is the rival of other men; he delights in competition, and this leads to ambition which passes too readily into selfishness. These latter qualities seem to be his natural and unfortunate birthright.'

Of course the greatest type of manhood, or the type wherein our ideal of manliness reaches its highest expression, is where the virtues of strength are purged from its vices. To be strong and yet tender, brave and yet kind, to combine in the same breast the temper of a hero with the sympathy of a maiden—this is to transform the ape and the tiger into what we know ought to constitute the man. And, if in actual life we find that such an ideal is but seldom realized, this should make us more lenient in judging the frailties of the opposite sex. These frailties are for the most part the natural consequences of our own, and even where such is not the case we do well to remember, as already observed, that they are less obnoxious than our own, and also that it is the privilege of strength to be tolerant. Now, it is a practical recognition of these things that leads to chivalry; and even those artificial courtesies which wear the mark of chivalry are of value, as showing what may be termed a conventional acquiescence in the truth that underlies them. This truth is, that the highest type of manhood can only then be reached when the heart and mind have been so far purified from the dross of a brutal ancestry as genuinely to appreciate, to admire, and to reverence the greatness, the beauty, and the strength which have been made perfect in the weakness of womanhood.

I will now pass on to consider the causes which have probably operated in producing all these mental differences between men and women. We have already seen that differences of the same kind occur throughout the whole mammalian series, and therefore we must begin by looking below the conditions of merely human life for the original causes of these differences in their most general form. Nor have we far to seek. The Darwinian principles of selection—both natural and sexual—if ever they have operated in any department of organic nature, must certainly have operated here. Thus, to quote Darwin himself:—

> Amongst the half-human progenitors of man, and amongst savages, there have been struggles between the males during many generations for the possession of the females. But mere bodily strength and size would do little for victory, unless associated *with courage, perseverance, and determined energy*. . . . To avoid enemies or to attack them with success, to capture wild animals, and to fashion weapons, requires reason, invention, or imagination. . . . These latter faculties, as well as the former, will have been developed in man partly through sexual selection—that is, through the contest of rival males, and partly through natural selection—that is, from success in the general struggle for life; and as in both cases the struggle will have been during maturity, the characters gained will have been transmitted more fully to the male than to the female offspring. . . . Thus man has ultimately become superior to woman. It is, indeed, fortunate that the law of the equal transmission of characters to both sexes prevails with mammals; otherwise it is probable that man would *have become as superior in mental endowment* to woman as the peacock is in ornamental plumage to the pea-hen.

Similarly, Mr. Francis Galton writes:—

> The fundamental and intrinsic differences of character that exist in individuals are well illustrated by those that distinguish the two sexes, and which begin to assert themselves even in the nursery, where all children are treated alike. One notable peculiarity in the woman is that she is capricious and coy, and has less straightforwardness than the man. It is the same with the female of every species. . . . [Were it not so], the drama of courtship, with its prolonged strivings and doubtful success, would be cut quite short, and the race would degenerate through the absence of that sexual selection for which the protracted preliminaries of love-making give opportunity. The willy-nilly disposition of the female is as apparent in the butterfly as in the man, and must have been continually favoured from the earliest stages of animal evolution down to the present time. Coyness and caprice have in consequence become a heritage of the sex, together with a cohort of allied weaknesses and petty deceits, that men have come to think venial, and even amiable, in women, but which they would not tolerate among themselves.

We see, then, that the principles of selection have thus determined greater strength, both of body and mind, on the part of male animals throughout the whole mammalian series; and it would certainly have been a most unaccountable fact if any exception to this rule had occurred in the case of mankind, for, as regards natural selection, it is in the case of mankind that the highest premium has been placed upon the mental faculties —or, in other words, it is here that natural selection has been most busy in the evolution of intelligence, and therefore, as Mr. Darwin remarks, we can only regard it as a fortunate accident of inheritance that there is not now a greater difference between the intelligence of men and of women than we actually find. Again, as regards sexual selection it is evident that here also the psychologically segregating influence must have been exceptionally strong in the case of our own species, seeing that in all the more advanced stages of civilization—or in the stages where mental evolution is highest, and, therefore, mental differences are most pronounced—marriages are determined quite as much with reference to psychical as to physical endowments; and as men always admire in women what they regard as distinctively feminine qualities of mind, while women admire in men the distinctively masculine, sexual selection, by thus acting directly as well as indirectly on the mental qualities of both, is constantly engaged in moulding the minds of each upon a different pattern.

Such, then, I take to be the chief, or at least the original, causes of the mental differences in question. But besides these there are sundry other causes all working in the same direction. For example, as the principles of selection have everywhere operated in the direction of endowing the weaker partner with that kind of physical beauty which comes *from slenderness and grace, it follows that there has* been everywhere a general tendency to impart to her a comparative refinement of organization; and in no species has this been the case in so high a degree as in man. Now, it is evident from what has been said in an earlier part of this paper that general refinement of this kind indirectly affects the mind in many ways. Again, as regards the analogous, though coarser, distinction of bodily strength, it is equally evident that their comparative inferiority in this respect, while itself one of the results of selection, becomes in turn the cause of their comparative timidity, sense of dependence, and distrust of their own powers on the part of women, considered as a class. Hence, also, their comparative feebleness of will and vacillation of purpose: they are always dimly conscious of lacking the muscular strength which, in the last resort—and especially in primitive stages of culture—is the measure of executive capacity. Hence, also, their resort to petty arts and pretty ways for the securing of their aims; and hence, in large measure, their strongly religious bias. The masculine character, being accustomed to rely upon its own strength, is self-central and self-contained: to it the need of external aid, even of a supernatural kind, is not felt to be so urgent as it is to the feminine character, whose only hope is in the stronger arm of another. 'The position of man is to stand, of woman to lean'; and, although it may be hard for even a manly nature to contemplate the mystery of life and the approach of death with a really stoic calm, at least this is not so impossible as it is for the more shrinking and emotional nature of a woman.

Lastly, from her abiding sense of weakness and consequent dependence, there also arises in woman that deeply-rooted desire to please the opposite sex which, beginning in the terror of a slave, has ended in the devotion of a wife.

We must next observe another psychological lever of enormous power in severing the mental structures of men and women. Alike in expanding all the tender emotions, in calling up from the deepest fountains of feeling the flow of purest affection, in imposing the duties of rigid self-denial, in arousing under its strongest form the consciousness of protecting the utterly weak and helpless consigned by nature to her charge, the maternal instincts are to woman perhaps the strongest of all influences in the determination of character. And their influence in this respect continues to operate long after the child has ceased to be an infant. Constant association with her growing children—round all of whom her affections are closely twined, and in all of whom the purest emotions of humanity are as yet untouched by intellect—imparts to the mother a fullness of emotional life the whole quality of which is distinctively feminine. It has been well remarked by Mr. Fiske that the prolonged period of infancy and childhood in the human species must from the first 'have gradually tended to strengthen the relations of the children to the mother,' and, we may add, also to strengthen the relations of the mother to the children—which implies an immense impetus to the growth in her of all the altruistic feelings most distinctive of woman. Thus, in accordance with the general law of inheritance as limited by sex, we can understand how these influences became, in successive generations, cumulative; while in the fondness of little girls for dolls we may note a somewhat interesting example in psychology of the law of inheritance at earlier periods of life, which Mr. Darwin has shown to be so prevalent in the case of bodily structures throughout the animal kingdom.

There remains, so far as I can see, but one other assignable cause of the mental differences between men and women. This cause is education. Using the term in its largest sense, we may say that in all stages of culture the education of women has differed widely from that of men. The state of abject slavery to which woman is consigned in the lower levels of human evolution clearly tends to dwarf her mind *ab initio.* And as woman gradually emerges from this her primitive and long-protracted condition of slavery she still continues to be dominated by the man in numberless ways which, although of a less brutal kind, are scarcely less effectual as mentally dwarfing influences. The stunting tendency upon the female mind of all polygamous institutions is notorious, and even in monogamous or quasi-monogamous communities so highly civilized as ancient Greece and pagan Rome woman was still, as it were, an intellectual cipher--and this at a time when the intellect of man had attained an eminence which has never been equalled. Again, for a period of about two thousand years after that time civilized woman was the victim of what I may term the ideal of domestic utility a state of matters which still continues in some of the continental nations of Europe. Lastly, even when woman began to escape from this ideal of domestic utility, it was only to fall a victim to the scarcely less deleterious ideal of ornamentalism. Thus Sydney Smith, writing in 1810, remarks: 'A century ago the prevailing taste in female education was for housewifery; now it is for accomplishments. The object now is to make women artists—to give them an excellence in drawing, music, and dancing.' It is almost needless to remark that this is still the prevailing taste: the ideal of female education still largely prevalent in the upper classes is not that of mental furnishing, but rather of mental decoration. For it was not until the middle of the present century that the first attempt was made to provide for the higher education of women, by the establishment of Queen's College and Bedford College in London. Twenty years later there followed Girton and Newnham at Cambridge; later still Lady Margaret's and Somerville at Oxford, the foundation of the Girls' Public Day Schools Company, the opening of degrees to women at the University of London, and of the honour examinations at Cambridge and Oxford.

We see, then, that with advancing civilization the theoretical equality of the sexes becomes more and more a matter of general recognition, but that the natural inequality continues to be forced upon the observation of the public mind; and chiefly on this account—although doubtless also on account of traditional usage—the education of women continues to be, as a general rule, widely different from that of men. And this difference is not merely in the positive direction of laying greater stress on psychological embellishment: it extends also in the negative direction of sheltering the female mind from all those influences of a striving and struggling kind which constitute the practical schooling of the male intellect. Woman is still regarded by public opinion all the world over as a psychological plant of tender growth which needs to be protected from the ruder blasts of social life in the conservatories of civilization. And, from what has been said in the earlier part of this paper, it will be apparent that in this practical judgement I believe public opinion to be right. I am, of course, aware that there is a small section of the public—composed for the most part of persons who are not accustomed to the philosophical analysis of facts—which argues that the conspicuous absence of women in the field of intellectual work is due to the artificial restraints imposed upon them by all the traditional forms of education; that if we could suddenly make a leap of progress in this respect, and allow women everywhere to compete on fair and equal terms with men, then, under these altered circumstances of social life, women would prove themselves the intellectual compeers of men. But the answer to this argument is almost painfully obvious. Although it is usually a matter of much difficulty to distinguish between ~~nature~~ and nurture, or between the results of inborn faculty and those of acquired knowledge, in the present instance no such difficulty obtains. Without again recurring to the anatomical and physiological considerations which bar *a priori* any argument for the natural equality of the sexes, and without remarking that the human female would but illustrate her own deficiency of rational development by supposing that any exception to the general laws of evolution can have been made in her favour—without dwelling on any such antecedent considerations, it is enough to repeat that in many departments of intellectual work the field *has* been open, and equally open, to both sexes. If to this it is answered that the traditional usages of education lead to a higher average of culture among men, thus furnishing them with a better vantage-ground for the origin of individual genius, we have only to add that the strong passion of genius is not to be restrained by any such minor accidents of environment. Women, by tens of thousands, have enjoyed better educational as well as better social advantages than a Burns, a Keats, or a

Faraday; and yet we have neither heard their voices nor seen their work. If, again, to this it be rejoined that the female mind has been unjustly dealt with in the past, and cannot now be expected all at once to throw off the accumulated disabilities of ages—that the long course of shameful neglect to which the selfishness of man has subjected the culture of woman has necessarily left its mark upon the hereditary constitution of her mind—if this consideration be adduced, it obviously does not tend to prove the equality of the sexes: it merely accentuates the fact of inequality by indicating one of its causes. The treatment of women in the past may have been very wrong, very shameful, and very much to be regretted by the present advocates of women's rights; but proof of the ethical quality of this fact does not get rid of the fact itself any more than a proof of the criminal nature of assassination can avail to restore to life a murdered man. We must look the facts in the face. How long it may take the woman of the future to recover the ground which has been lost in the psychological race by the woman of the past it is impossible to say; but we may predict with confidence that, even under the most favourable conditions as to culture, and even supposing the mind of man to remain stationary (and not, as is probable, to advance with a speed relatively accelerated by the momentum of its already acquired velocity), it must take many centuries for heredity to produce the missing five ounces of the female brain.

In conclusion, a few words may be added on the question of female education as this actually stands at the present time. Among all the features of progress which will cause the present century to be regarded by posterity as beyond comparison the most remarkable epoch in the history of our race, I believe that the inauguration of the so-called woman's movement in our own generation will be considered one of the most important. For I am persuaded that this movement is destined to grow; that with its growth the highest attributes of one half of the human race are destined to be widely influenced; that this influence will profoundly react upon the other half, not alone in the nursery and the drawing-room, but also in the study, the academy, the forum, and the senate; that this latest yet inevitable wave of mental evolution cannot be stayed until it has changed the whole aspect of civilization. In an essay already alluded to, Sydney Smith has remarked, though not quite correctly, that up to his time there had been no woman who had produced a single notable work, either of reason or imagination, whether in English, French, German, or Italian literature. A few weeks ago Mrs. Fawcett was able to show us that since then there have been at least forty women who have left a permanent mark in English literature alone. Now, this fact becomes one of great significance when we remember that it is the result of but the earliest phase of the woman's movement. For, as already indicated, this movement is now plainly of the nature of a ferment. When I was at Cambridge, the then newly-established foundations of Girton and Newnham were to nearly all of us matters of amusement. But we have lived to alter our views, for we have lived to see how that was but the beginning of a great social change, which has since spread, and is still spreading, at so extraordinary a rate that we are now within measurable distance of the time when no English lady will be found to have escaped its influence. It is not merely that women's colleges are springing up like mushrooms in all quarters of the kingdom, or that the old type of young ladies' governess is being rapidly starved out of existence. It is of much more importance even than this that the immense reform in girls' education which has been so recently introduced by the Day Schools Company working in conjunction with the University Board and local examinations has already shaken to its base the whole system and even the whole ideal of female education, so that there is scarcely a private school in the country which has not been more or less affected by the change. In a word, whether we like it or not, the woman's movement is upon us; and what we have now to do is to guide the flood into what seem likely to prove the most beneficial channels. What are these channels?

Of all the pricks against which it is hard to kick, the hardest are those which are presented by Nature in the form of facts. Therefore we may begin by wholly disregarding those short-sighted enthusiasts who seek to overcome the natural and fundamental distinction of sex. No amount of female education can ever do ~~this,~~ nor is it desirable that it should. On this point I need not repeat what is now so often and so truly said, as to woman being the complement, not the rival, of man. But I should like to make one remark of another kind. The idea underlying the utterances of all these enthusiasts seems to be that the qualities wherein the male mind excels that of the female are *sui generis* the most exalted of human faculties: these good ladies fret and fume in a kind of jealousy that the minds, like the bodies, of men are stronger than those of women. Now, is not this a radically mistaken view? Mere strength, as I have already endeavoured to insinuate, is not the highest criterion of nobility. Human nature is a very complex thing, and, among the many ingredients which go to make the greatness of it, even intellectual power is but one, and not by any means the chief. The truest grandeur of this nature is revealed by that nature as a whole, and here I think there can be no doubt that the feminine type is fully equal to the masculine, if indeed it be not superior. For I believe that, if each one of us goes back in his memory to seek, for the highest experience he has had in this respect, the character which will stand out as all in all the greatest he has ever known will be the character of a woman. Or, if any of us have not been fortunate in this matter, where in fiction or in real life can we find a more glorious exhibition of all that is best—the mingled strength and beauty, tact, gaiety, devotion, wit, and consummate ability—where but in a woman can we find anything at once so tender, so noble, so lovable, and so altogether splendid as in the completely natural character of a Portia? A mere blue-stocking who looks with envy on the intellectual gifts of a Voltaire, while shutting her eyes to the gifts of a sister such as this, is simply unworthy of having such a sister: she is incapable of distinguishing the pearl of great price among the sundry other jewels of our common humanity.

Now, the suspicion, not to say the active hostility, with which the so-called woman's movement has been met in many quarters springs from a not unhealthy ground of public opinion. For there can be no real doubt that these things are but an expression of the value which that feeling attaches to all which is held distinctive of feminine character as it stands. Woman, as she has been bequeathed to us by the many and complex influences of the past, is recognized as too precious an inheritance lightly to be tampered with, and the dread lest any change in the conditions which have given us so beautiful a product should lead, as it were, to desecration, is in itself both wise and worthy. In this feeling we have the true safeguard of womanhood; and we can hope for nothing better than that the deep, strong voice of social opinion will always be raised against any innovations of culture which may tend to spoil the sweetest efflorescence of evolution.

But, while we may hope that social opinion may ever continue opposed to the woman's movement in its most extravagant forms—or to those forms which endeavour to set up an unnatural, and therefore an impossible, rivalry with men in the struggles of practical life—we may also hope that social opinion will soon become unanimous in its encouragement of the higher education of women. Of the distinctively feminine qualities of mind which are admired as such by all, ignorance is certainly not one. Therefore learning, as learning, can never tend to deteriorate those qualities. On the contrary, it can only tend to refine the already refined, to beautify the already beautiful—when our daughters shall be as corner-stones, polished after the similitude of a palace; it can only tend the better to equip a wife as the helpmeet of her husband, and, by furthering a community of tastes, to weave another bond in the companionship of life; it can only tend the better to prepare a mother for the greatest of her duties—forming the tastes and guiding the minds of her children at a time of life when these are most pliable, and under circumstances of influence such as can never again be reproduced.

It is nearly eighty years ago since this view of the matter was thus presented by Sydney Smith:—

> If you educate women to attend to dignified and important subjects, you are multiplying beyond measure the chances of human improvement by preparing and medicating those early impressions which always come from the mother, and which, in the majority of instances, are quite decisive of genius. The instruction of women improves the stock of national talents, and employs more minds for the instruction and improvement of the world: it increases the pleasures of society by multiplying the topics upon which the two sexes take a common interest, and makes marriage an intercourse of understanding as well as of affection. The education of women favours public morals; it provides for every season of life, and leaves a woman when she is stricken by the hand of time, not as she now is, destitute of everything and neglected by all, but with the full power and the splendid attractions of knowledge—diffusing the elegance of polite literature and receiving the homage of learned and accomplished men.

Since the days when this was written the experiment of thus educating women to attend to dignified and important subjects has been tried on a scale of rapidly increasing magnitude, and the result has been to show that those apprehensions of public opinion were groundless which supposed that the effect of higher education upon women would be to deteriorate the highest qualities of womanhood. On this point I think it is sufficient to quote the opinion of a lady who has watched the whole course of this experiment, and who is so well qualified to give an opinion that it would be foolish presumption in any one else to dispute what she has to say. The lady to whom I refer is Mrs. Sidgwick, and this is what she says:—

> The students that I have known have shown no inclination to adopt masculine sentiments or habits in any unnecessary or unseemly degree; they are disposed to imitate the methods of life and work of industrious undergraduates just as far as these appear to be means approved by experience to the end which both sets of students have in common, and nothing that I have seen of them, either at the University or afterwards, has tended in the smallest degree to support the view that the adaptation of women to domestic life is so artificial and conventional a thing that a few years of free unhampered study and varied companionship at the University have a tendency to impair it.

So far as I am aware, only one other argument has been, or can be, adduced on the opposite side. This argument is that the physique of young women as a class is not sufficiently robust to stand the strain of severe study, and therefore that many are likely to impair their health more or less seriously under the protracted effort and acute excitement which are necessarily incidental to our system of school and university examinations.

Now, I may begin by remarking that with this argument I am in the fullest possible sympathy. Indeed, so' much is this the case that I have taken the trouble to collect evidence from young girls of my own acquaintance who are now studying at various high schools with a view to subsequently competing for first classes in the Cambridge triposes. What I have found is that in some of the high schools—carefully observe, only in *some*—absolutely no check is put upon the ambition of young girls to distinguish themselves and to bring credit upon their establishments The consequence is that in these schools the more promising pupils habitually undertake an amount of intellectual work which it is sheer madness to attempt. A single quotation from one of my correspondents—whom I have known from a child—will be enough to prove this statement.

> I never begin work later than six o'clock, and never work less than ten or eleven hours a day. But within a fortnight or so of my examinations I work fifteen or sixteen hours. Most girls, however, stop at fourteen or fifteen hours, but some of them go on to eighteen hours. Of course, according to the school time-tables, none of us should work more than eight hours; but it is quite impossible for any one to get through the work in that time. For instance, in the time-tables ten minutes is put down for botany, whereas it takes the quickest girl an hour and a half to answer the questions set by the school lecturer.

These facts speak for themselves, and therefore I will only add that in many of those high schools for girls which are situated in large towns no adequate provision is made for bodily exercise, and this, of course, greatly aggravates the danger of over-work. In such a school there is probably *no playground; the gymnasium, if there is one*, is not attended by any of the harder students; drill is never thought of, and the only walking exercise is to and from the school. Let it not be supposed that I am attacking the high school system. On the contrary, I believe that this system represents the greatest single reform that has ever been made in the way of education. I am only pointing out certain grave abuses of the system which are to be met with in some of these schools, and against which I should like to see the full force of public opinion directed. There is no public school in the kingdom where a boy of sixteen would be permitted to work from eleven to eighteen hours a day, with no other exercise than a few minutes' walk. Is it not, then, simply monstrous that a girl should be allowed to do so? I must confess that I have met with wonderfully few cases of serious breakdown. All my informants tell me that, even under the operation of so insane an abuse as I have quoted, grave impairment of health but rarely occurs. This, however, only goes to show of what good stuff our English girls are made; and therefore may be taken to furnish about the strongest answer I can give to the argument which I am considering—viz. that the strength of an average English girl is not to be trusted for sustaining any reasonable amount of intellectual work. Upon this point, however, there is at the present time a conflict of medical authority, and, as I have no space to give a number of quotations, it must suffice to make a few general remarks.

In the first place, the question is one of fact, and must, therefore, be answered by the results of the large and numerous experiments which are now in progress, not by any *a priori* reasoning of a physiological kind. In the next place, even as thus limited, the inquiry must take account of the wisdom or unwisdom with which female education is pursued in the particular cases investigated. As already remarked, I have been myself astonished to find so great an amount of prolonged endurance exhibited by young girls who are allowed to work at unreasonable pressure; but, all the same, I should of course regard statistics drawn from such cases as manifestly unfair. And, seeing that every case of health impaired is another occasion given to the enemies of female education, those who have the interests of such education at heart should before all things see to it that the teaching of girls be conducted with the most scrupulous precautions against over-pressure. Regarded merely as a matter of policy, it is at the present moment of far more importance that girls should not be overstrained than that they should prove themselves equal to young men in the class lists. For my own part, I believe that, with reasonable precautions against over-pressure, and with due provision for bodily exercise, the higher education of women would *ipso facto* silence the voice of medical opposition. But I am equally persuaded that this can never be the case until it becomes a matter of general recognition among those to whom such education is entrusted that no girl should ever be allowed to work more than eight hours a day as a *maximum*—though even this will in a large proportional number of cases be found to prove excessive; that without abundant exercise higher education should never be attempted; and that, as a girl is more liable than a boy to insidiously undermine her constitution, every girl who aspires to any distinction in the way of learning should be warned to be constantly on the watch for the earliest symptoms of impairment. If these reasonable precautions were to become as universal in the observance as they now are in the breach, I believe it would soon stand upon the unquestionable evidence of experimental proof that there is no reason in the nature of things why women should not admit of culture as wide and deep and solid as our schools and universities are able to provide.

The channels, therefore, into which I should like to see the higher education of women directed are not those which run straight athwart the mental differences between men and women which we have been considering. These differences are all complementary to one another, fitly and beautifully joined together in the social organism. If we attempt to disregard them, or try artificially to make of woman an unnatural copy of man, we are certain to fail, and to turn out as our result a sorry and disappointed creature who is neither the one thing nor the other. But if, without expecting women as a class to enter into any professional or otherwise foolish rivalry with men, for which as a class they are neither physically nor mentally fitted, and if, as Mrs. Lynn Linton remarks, we do not make the mistake of confusing mental development with intellectual specialization—if, without doing either of these things, we encourage women in every way to obtain for themselves the intrinsic advantages of learning, it is as certain as anything can well be that posterity will bless us for our pains. For then all may equally enjoy the privilege of a real acquaintance with letters; ladies need no longer be shut out from a solid understanding of music or painting; and lecturers on science will no longer be asked at the close of their lectures whether the cerebellum is inside or outside of the skull, how is it that astronomers have been able to find out the names of the stars, or whether one does not think that his diagram of a jelly-fish serves with admirable fidelity to illustrate the movements of the solar system. These, of course, I quote as extreme cases, and even as displaying the prettiness which belongs to a child-like simplicity. But simplicity of this kind ought to be put away with other childish things; and, in whatever measure it is allowed to continue after childhood is over, the human being has failed to grasp the full privileges of human life. Therefore, in my opinion the days are past when any enlightened man ought seriously to suppose that in now again reaching forth her hand to eat of the tree of knowledge woman is preparing for the human race a second fall. In the person of her admirable representative, Mrs. Fawcett, she thus pleads: 'No one of those who care most for the woman's movement cares one jot to prove or to maintain that men's brains and women's brains are exactly alike or exactly equal. All we ask is that the social and legal status of women should be such as to foster, not to suppress, any gift for art, literature, learning, or goodness with which women may be endowed.' Then, I say, give her the apple, and see what comes of it. Unless I am greatly mistaken, the result will be that which is so philosophically as well as so poetically portrayed by the Laureate:

> The woman's cause is man's: they rise or sink
> Together, dwarf'd or god-like, bond or free.
>
> * * * * *
>
> Then let her make herself her own
> To give or keep, to live and learn to be
> All that not harms distinctive womanhood,
> For woman is not undevelopt man,
> But diverse: could we make her as the man,
> Sweet Love were slain: his dearest bond is this,
> Not like to like, but like in difference.

Yet in the long years liker must they grow;
The man be more of woman, she of man;
He gain in sweetness and in moral height,
Nor lose the wrestling thews that throw the world;
She mental breadth, nor fail in childward care,
Nor lose the child-like in the larger mind;
Till at the last she set herself to man,
Like perfect music unto noble words.

Then comes the statelier Eden back to men:
Then reign the world's great bridals, chaste and calm:
Then springs the crowning race of human kind.
May such things be!

VII.

WHAT IS THE OBJECT OF LIFE?

SEVERAL years ago Mr. Mallock raised the question 'Is life worth living?' A warm discussion followed; but, so far as I am aware, none of those who took part in the debate appeared to notice that any answer to this question must necessarily presuppose some agreement upon the previous question which forms the title of this article. No doubt Mr. Mallock, and all who followed in the debate which he opened, took it for granted that the object of life is the attainment of happiness, and, therefore, that whether or not life is worth living must depend for each individual on the state of the balance between his pleasures and his pains. But this implied answer to the previous question is open to two objections. In the first place it is too vague, and in the next place it is of doubtful truth. It is too vague inasmuch as it disregards the ethical question touching the quality of pleasures and pains in respect of what the intuitionists call 'higher' and 'lower.' The term 'happiness' thus becomes but a short-hand mode of expressing a desirable state of existence; and, therefore, to say that life is or is not worth living according as happiness preponderates or does not preponderate over unhappiness becomes but a barren truism: life is worth living if it is desirable to live; it is worth living if it is worth living. Under this point of view, therefore, it seems that the real question raised by Mr. Mallock was whether, upon the whole, desirable states of existence preponderate over undesirable, so far as the individual consciousness is concerned. The question thus becomes a question of fact which each man can determine only for himself; and, forasmuch as we find all degrees of idiosyncrasy between the extremes of optimism and pessimism, it is obvious that no general answer, applicable to all mankind, can be given. Again, in the second place, besides being too vague, the implied answer before us is of doubtful truth. For it appears to assume that the question to which it is an answer is not concerned with anything beyond the limits of the individual consciousness. Yet this is clearly not the case. For the question is not, Is *my* life worth living to *me?* This would be a comparatively simple question, being, as I have said, but a question of fact, which each individual may be presumed to be capable of judging by an immediate appeal to his own feelings; but the question is as to whether or not the whole sum of human life is worth living. And, forasmuch as each individual life reacts on many other individual lives in respect of causing them happiness or the reverse, there arises this further question for each individual mind: Quite irrespectively of my own states of feeling, is my life worth living for the sake of the happiness which it may help to shed on others? Now, these two questions are obviously quite distinct: the question, Is life worth living? may admit of one answer in terms of egoism, and of precisely the opposite answer in terms of altruism. For which reason I say that any answer to this question must be of doubtful truth which only takes into account the state of balance between pleasures and pains on the part of the individual who is answering.

Clearly, then, in order to answer this question we must have obtained some more definite answer to the previous question (What is the object of life?) than is derived by saying, The attainment of happiness for myself. So long as man remains human he will have a moral sense, and, therefore, even if any man were to endeavour on principle to achieve his own happiness without regard to the happiness of others, he would carry that in his own nature which must necessarily defeat his own object; in shutting out all consideration for the happiness of others he would be most effectually closing the door to happiness against himself. Hence the question, Is life worth living? presupposes some answer to the question, What is the object of life? And this answer cannot be given on a basis of egoism alone, or by saying that the object of life is the attainment of maximum happiness for self. In order to give a full answer to the question there must be included the element of altruism; one must say that the object of life is the attainment of maximum happiness, but whether for myself or for others I ought not to wait to consider. Very often, indeed usually, the attainment of another's happiness will best ensure the attainment of my own; but, even where this is not the case, my aim should be the attainment of the greatest sum of happiness, be it my own or that of my neighbour. From which it follows that the object of life is that of making life desirable, first to myself, and next to those around me.

So far it is scarcely to be expected that any differences of opinion will arise. But, when we pass from this bare enunciation of the object of life, stated in its most general terms, to the practical question of how this object is to be attained, we arrive at the branching place of many ways of thought. The Christian who counts the loss of all earthly pleasures but as dung so that he may win Christ must necessarily shape his conduct on totally different lines from the agnostic, even though both be conscientiously aiming at the same object of life. The Shorter Catechism defines the 'chief end of man' (i. e. the object of life) as that of glorifying God and enjoying him for ever; in somewhat longer phraseology the English Church Catechism conveys a similar doctrine; and both sum up the 'whole duty of man' as duty first to God, and next to neighbour. And similarly with all other systems of religious belief, however widely they may differ in their teachings as to what exactly these respective duties are. Now in all these systems of doctrine the implied basis is the same; and it is nothing other than that which has been furnished by ethical thought in the well-worn phrase 'the greatest happiness of the greatest number.' The reason why it is the chief end of man to glorify God is because, according to Christian belief, this is the happiest thing for him to do; 'it is good for us to be here,' so that we may 'enjoy God for ever.' Hence the altruistic desire of all Christians that others should be as they are—partakers of the highest joy of which a creature is capable. And, obviously, the only reason why infidelity does not join in missionary effort is that infidelity supposes this land of joy to be delusive. But the object of infidelity is the same as that of religious faith, namely, to bring the human mind into such harmony with what is believed to be its true environment as will in the long run prove most conducive to its wellbeing or happiness. The difference between the Christian and the infidel is, therefore, not a difference of aim, but merely a difference in what they severally believe to constitute the truest welfare of the race. And so, of course, with regard to other systems of religion, different systems of philosophy, grades of civilization, and so forth. Now, my purpose in taking part in this discussion is that of furnishing a general answer to this question of method, or means, of attaining the common object of life, and one which it appears to me all enlightened men, of whatever creed or country, ought to agree in accepting. Any such general agreement can only be secured on a basis of observable fact. I, therefore, propose to take the human mind as we find it, and to ascertain by a mere observation of its constitution how it best admits of being brought into harmony with its environment, or, in other words, how it best admits of being brought to find joy in its own existence.

Taking, then, the human mind as it is, I cannot conceive the possibility of any one disputing the fact that the deepest and the strongest of its feelings—those with which its capacities of happiness and of misery are most intimately involved—are the feelings which belong to the order of what we call love. No doubt in many individual cases other emotions, such as ambition, avarice, &c., are stronger and deeper still; but as a rule of very wide generality, alike in men, women, and children, the ties of mutual affection are by far the most important constituents of the psychological fabric. Moreover, they are by far the most productive of happiness. This must be acknowledged by every one; so that, even though a man should feel conscious of spiritual poverty in this respect, it is impossible for him not to know that it is a kind of poverty which can never be recompensed by any of the world's goods, as wealth, fame, &c. Hence, all systems of religion and of morality that pretend to any degree of culture are built upon this foundation-stone of love. It makes no difference to our present discussion whether this supreme dominion of love in the constitution of mind has been due to the intentional design of a God of love or to the principles of evolution having constantly set the highest premium on a quality of mind so useful to a social animal. It is enough for us that, as matters actually stand, love is both the strongest of our emotions and the one which is most productive of happiness. Hence, unless it be denied that the object of life is that of promoting happiness, it must be conceded that the chief object of life is that of promoting love, both in ourselves and in others; which, of course, is no more than a restatement of the 'golden rule,' to love one's neighbours as oneself.

But although we may all agree that this is the chief object of life, or, apart from any matters of religious belief, 'the chief end of man,' it obviously does not comprise the whole object of life, seeing that the promoting of love does not by any means exhaust the possibilities of promoting happiness, either in ourselves or in others. What, then, are the other principles, besides that of promoting love, which remain to be mentioned, and which are also of a sufficiently general nature to claim universal assent? So far as I can see, they are only two in number. One of them is the duty of ministering to the wants of the body; the other is the duty of ministering to the wants of the mind.

Touching the first of these two duties it is not needful to say much. Every citizen recognizes the obligation of seeing that his neighbour does not want for food and clothing; every husband and father knows that his wife and children have a natural right to look to him for protection from cold and hunger. And, in the last resort, it is a general recognition of these things which lies at the root of all the social industry which goes by the name of labour, trade, and commerce. For, although a merchant-prince never requires to contemplate the possibility of starvation in his own household, his work is primarily directed to the attainment of benefits of the material order, and thus he is still, though doubtless in a greatly extended sense, the 'bread-winner' of his family. In other words, *qua* merchant-prince, he is working for the forms of happiness which arise from luxuries of sense; not for those which arise from cultivation of mind. Now, it is the common conviction of almost every one who has had experience of both these forms of happiness that the Hedonistic value of the latter is greatly inferior to that of the former; in other words, that the pleasures which are called intellectual are much more productive of happiness than those which are called sensuous. But, if this is so, it clearly follows that the attainment of intellectual culture must be regarded as a higher object of life than the attainment of sensuous gratification, in however refined a form. No doubt, in its higher levels, such gratification demands intellectual culture as a needful condition, the fine arts in all their branches growing from the root of sensuous perception. But this needful overlapping of the pleasures of sense and the pleasures of intellect in the higher levels of the former does not obscure the difference between them elsewhere. Such overlapping arises only from the fact that intellect is obliged to work with the tools of sense, and the distinction consists in these tools being here the means of working, and not themselves the ends for which we work.

Now, if it is true that next only to what may be termed the emotional happiness of love there stands the intellectual happiness of thought, it appears to me that *the two great objects of life are to love and to think.* And it further appears to me that in this verdict men of all schools ought to agree. Whether the relations that obtain between man and his environment be supposed due to a mechanical process of adaptation alone, or likewise and ultimately to a disposing mind, it *must be equally true that the object of his life is* that of living his life in accordance with its 'design,' no matter whether this word be used in a literal or in a metaphorical sense. For in this way, and in this way only, can he hope to secure that fullest harmony with his environment upon which he knows that his happiness must depend. Or, otherwise stated, if *we turn the question*, What *is the* object of life? into any of its equivalents, such as, Why are we here? What do we live for? How should we act? the answer must always be, In order to work as we seem designed to work. And, if the final end of our working be taken to consist in the production of happiness, we find, as a matter of fact, that the machinery of the Ego is so constituted that it can only work to this end when actuated by the motive principles of love and thought.

To this it will at once be replied that much has to be said *per contra*. For it is evident that in the very measure of our love is poured out to us the bitterness of death, while the greater our capacity of thought the more dismal is the void of mystery. Therefore it may be said that the more we are victimized by the allurements of love the greater is the misery that is in store for us; and the more we increase our knowledge the more do we increase our sorrow. This, in effect, is the reasoning of pessimism, so far as pessimism has ever appeared to me rational. And the only answer I know to this reasoning is that both love and thought are, so to speak, sanctified by the very solemnity of their limitations. Moreover, as a matter of fact, explain it how we may, there is no one who has both loved and thought who would willingly have forgone the experience. Although he well knows the double pang so necessarily attendant on these, the noblest functions of his being, no consideration could induce him to desire an exchange of what he feels to be the higher life of a man for anything that he would recognize as approximating to the lower life of a brute. It is

> 'Better to have loved and lost than never to have loved at all';

and, to take cognizance of the human complement of thought—strangely doomed though we may fear it to be to an infinite disappointment—must we not still add, It is better to have lived and died than never to have lived at all?

Following Tennyson, I have said that no one who has lived the higher life, whether of love or of thought, could possibly desire to exchange it for a lower one; and this seems the best possible answer to the reasonings of the pessimist, seeing that it is an answer directly yielded by subjective consciousness to itself. But I have also said that the practical question, What do we live for? admits of being still further tested by observing for what it is that we seem to be designed, whether the latter term be used in its literal sense or as implying the outcome of a mechanical evolution; for, in either case, happiness must be best attainable by our best conforming to those conditions of existence for agreement with which we have been brought into life. Now, if we look upon the matter in this its objective aspect, we obtain substantially the same answer to our question. For, without dispute, the faculties most distinctive of man are those of love and thought. No doubt the lower animals present both these faculties in germ; but the love and thought which they manifest give rise to only the feeblest gleams of altruism on the one hand and of wonder on the other. It is only man who can be defined as either a moral animal or a wondering animal. And in respect of both these faculties his development is so great that, were it not for what we now believe to have been the history of this evolution, we should be justified in endorsing the opinion of all previous generations, and holding that they are the initial or most fundamental faculties of his being. And even upon the theory of evolution we are justified in assigning to them an almost basal position in the fabric of our mind, seeing that they both occur with such conspicuous prominence in early childhood. But, if it is thus true that love and thought—conscience and wonder—are the faculties most distinctive of man, it appears to me that we have an objective verification of the conclusion previously reached by subjective analysis, viz. that the object of our human life must be that of exercising these our distinctively human faculties; and that, the better each one of us can succeed in doing this, the more fully is he living the life which is most distinctively the life of a man.

VIII.

RECREATION[1].

LADIES AND GENTLEMEN,—When your Council honoured me with an invitation to deliver a lecture before you, I experienced some difficulty in choosing a subject appropriate to the circumstances under which I was requested to address you. For I was led to anticipate, not merely that my audience should be a highly cultured one, but also that it would expect from me a discourse the subject of which should be confined within certain somewhat narrow limits. That is to say, I was led to understand that the subject of my discourse should be of a physiological nature; that it should have special reference to the admirable objects which it is the *aim of your society to promote; and that it should* be, to a large extent, of a practical as distinguished from a theoretical character. Such being the conditions by which the choice of my subject was restricted, I felt that I could select no topic more suitable to the occasion than the one I have selected

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[1] Expanded from notes of a Lecture delivered before the National Health Society, on April 10, 1879.

—namely, Recreation. In all places of the civilized world, and in all classes of the civilized community, the struggle for existence is now more keen than ever it has been during the history of our race. Everywhere men and women and children are living at a pressure positively frightful to contemplate. Amid the swarming bustle of our smoke-smothered towns surrounded by their zone of poisoned trees, amid the whirling roar of machinery, the scorching blast of furnaces, and in the tallow-lighted blackness of our mines—everywhere, over all the length and breadth of this teeming land, men and women and children, in no metaphor, but in cruel truth, are struggling for life. Even our smiling landscapes support as the sons of their soil a new generation, to whom the freedom of gladness is a tradition of the past, and on whose brows is stamped, not only the print of honest work, but a new and saddening mark—the brand of sickening care. Or if we look to our universities and schools, to our professional men and men of business, we see this same fierce battle rage—ruined health and shattered hopes, tearful lives and early deaths being everywhere the bitter lot of millions on millions who toil, and strive, and love, and bleed their young hearts' blood in sorrow. In such a world and at such a time, when more truly than ever it may be said that the whole creation groans in pain and travail, I do not know that for the purposes of health and happiness there is any subject which it is more desirable that persons of all classes should

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With a view, then, of obtaining some such intelligent understanding of recreation, let us begin by clearly understanding what recreation means. First of all, the mere word, like many of our other English words that signify abstractions, condenses much philosophy within itself. For, as 'creation' means a forming, 're-creation' means a forming anew; and as in etymological derivation so in actual truth re-creation is nothing other than a re-novation of the vital energies; leisure time and appropriate employment serve to repair the organic machinery which has been impaired by the excess of work. The literal meaning of the word is therefore in itself instructive, as showing that what our forefathers saw in recreation was not so much play, pastime, or pleasantry, as that of the restoration of enfeebled powers of work. And I do not know that within the limits of one word they could have left us a legacy of thought more true in itself or more solemn in its admonition. Recreation is, *or ought to be*, not a pastime entered upon for the sake of the pleasure which it affords, but an act of duty undertaken for the sake of the subsequent power which it generates, and the subsequent profit which it ensures. Therefore, expanding the philosophy which is thus condensed in our English word, we may define recreation as that which with the least expenditure of time renders the exhausted energies most fitted to resume their work. Such *is my definition of recreation; yet I know that* many things are called by this name which cannot possibly fall within this definition, and I doubt whether nine persons out of ten ever dreamed, either of attaching such a meaning to the word, or of applying such a principle to the thing. Nevertheless I also know that, in whatever degree so-called recreation fails to be covered by my definition, in that degree does it fail, properly speaking, to be recreation at all. It may be amusement, fun, or even profitable employment; but it is not that particular thing which it is the object of this lecture to consider. Therefore, the definition which I have laid down may be taken as a practical test of recreation as genuine or spurious. If recreation is of a kind that renders a man less fitted for work than would some other kind of occupation, or if it consumes more time than would some other kind of occupation which would secure an equal amount of recuperation, then, in whatever degree this is so, in that degree must the quality of such recreation be pronounced impure.

So much, then, for the meaning of recreation. The next point that I shall consider is the physiology of recreation. It may have struck some of you as a somewhat curious question, why some actions or pursuits should present what I may call a recreative character, and others not. For it is evident that this character is by no means determined by the relief from *labour* which these actions or pursuits secure. A week on the moors involves more genuine hard work than does a week in the mines, and a game of chess may require as much effort of thought as a problem in high mathematics. Moreover, the same action or pursuit may vary in its recreative quality with different individuals. Rowing, which is the favourite recreation of the undergraduate, is serious work to the bargeman; and you will never find a gardener to resemble his master in showing a partiality to digging for digging's sake. If you answer that it is the need of bodily exercise which renders muscular activity beneficial to the one class and not to the other, I answer, no doubt it is so partly, but not wholly; for why is it that a man of science should find recreation in reading history, while an historian finds recreation in the pursuit of science? or why is it that a London tradesman should find a holiday in the country beneficial, while a country tradesman finds a holiday in London no less so? The truth seems to me to be that the only principle which will serve to explain the recreative quality in all cases is what I may call the physiological necessity for frequent change of organic activity, and the consequent physiological value of variety in the kinds and seasons of such activity. In order to render this principle perfectly clear, it will be necessary for me very briefly to explain the physiology of nutrition.

When food is taken into the body it undergoes a variety of processes which are collectively called digestion and assimilation. Into the details of these processes I need not enter, it being enough for my present purposes to say that the total result of these processes is to strain off the nutritious constituents of the food, and pour them into the current of the blood. The blood circulates through nearly all the tissues of the body, being contained in a closed system of tubes. This system of tubes springs from the heart in the form of large hollow trunks which ramify into smaller and smaller tube-branches. These are all called arteries. The smaller arteries again ramify into a continuous meshwork of so-called capillaries. Capillaries are also closed tubes, but differ from arteries in being immensely more numerous, more slender, and more tenuous in their walls. These capillaries pervade the body in such an intimate meshwork that you cannot run a needle's point into any part of the body where they occur without destroying the integrity of some of them, and so causing an outflow of blood.

As these capillaries ramify from the arteries, so do they again coalesce into larger tubes, and these into larger, and so on, until all this system of return tubing ends again in the heart in the form of large *hollow trunks.* The tubes *composing this system* of return tubing are called the veins; thus the whole blood-vascular system may be likened to two trees which are throughout joined together by their leaves, and also by activity at the bottoms of their trunks—the heart. The branches of both trees being everywhere hollow, the contained fluid runs up the stem and through smaller and smaller branches of the arterial tree into the delicate vessels of the leaves, which may be taken to represent the capillaries. Passing through these into the twigs of the venous tree, the blood returns through larger and larger branches of this tree till it arrives at the trunk, and completes its circuit by again entering the trunk of the arterial tree through the cavities of the heart. Now the blood, in perpetually making this complete circuit of the body, *performs three important functions: it serves to* carry oxygen from the lungs to all the other parts of the body; it serves to supply all parts of the body with the nutritive material with which it is charged; and it serves to drain off from all the tissues of the body the effete products which they excrete, and to present these effete products to the organs whose function it is again to abstract them from the blood and expel them from the body. The two latter functions of the blood—those of nourishing and draining—I must consider more in detail. They are both performed in the capillaries, so that the object of the arteries and veins may be considered as merely that of conveying the blood to and from the capillaries. Moreover, both functions are performed by transfusion through the delicate walls of the capillaries—the nutritive material in the blood being thus transfused into the surrounding tissues, and the waste product of these tissues being transfused into the blood. Thus, in the various tissues there is always a double process going on—first, that of receiving nourishment from the blood whereby they are being constantly built up into an efficient state for the performance of their various functions; and, secondly, that of discharging into the blood the effete materials which the performance of these functions entails. Now, when any tissue or organ is in a state of activity in the performance of its function, the activity which it manifests entails a process of disintegration, which is the reverse of the process of nutrition; that is to say, when a tissue or organ is doing its work it is expending energy which it has previously derived in virtue of the process of nutrition. Work is therefore, so to speak, the using up of nutrition; so that, if the income of energy due to nutrition is equal to the expenditure of energy due to work, the tissue or organ will remain stationary as regards its capacity for further work, while, if the work done is in excess of the nutrition supplied, the tissue or organ will soon be unable to continue its work; it will become, as we say, exhausted, cease to work, and remain passive until it is again slowly and gradually refreshed or built up by the process of nutrition. Thus all the tissues and organs of the body require periods of rest to alternate with periods of activity; and what is true of each part of the body is likewise true of the body as a whole—sleep being nothing other than a time of general rest during which the process of nutrition is allowed to gain upon that of exhaustion. Thus we may have local exhaustion—as when the muscles of our arm are no longer able to hold out a heavy weight—or we may have general exhaustion, as in sleep; and we may have local restorations due to nutrition—as when our exhausted arm, after some interval of rest, is again able to sustain the weight—or we may have a general restoration due to nutrition, as in the effects of sleep.

I have now said enough about the physiology of nutrition to render quite clear what I mean by recreation depending on the physiological necessity for a frequent change of organic activity. For although in the case of some organs—such as most of the secreting organs—activity is pretty constant, owing to the constant expenditure of energy being just about balanced by the constant income, in the case of nerves and muscles this is not so; but during the times at which these organs are in activity their expenditure of energy is so vastly greater than their income during the same times that they can only do their work by drawing upon the stores of energy which have been laid up by them during the comparatively long periods of their previous rest. Now recreation applies only to nerve and muscle; and what it amounts to is simply this—a change of organic activity, having for its object the affording of time for the nutrition of exhausted portions of the body. A part of the body having become exhausted by work done, and yet the whole of the body not being exhausted so far as to require sleep, recreation is the affording of local sleep to the exhausted part by transferring the scene of activity from it to some other part. Be it observed that a certain amount of activity is necessary for the life and health of all the organs of the body; so it would not do for the community of organs as a whole that, when any one set becomes exhausted by activity, all the others should share in their time of rest, as in general sleep. But, by transferring the state of activity from organs already exhausted by work to organs which are ready nourished to perform work, recreation becomes analogous to local sleep.

Thus we see that, in a physiological, no less than in a psychological, sense, the term re-creation is a singularly happy one; for we see that as a matter of fact the whole physiology of recreation consists merely of a re-building-up, re-forming, or re-creation of tissues which have become partly broken down by the exhausting effects of work. So that in this physiological sense recreation is partial sleep, while sleep is universal recreation. And now we see why it is that the one essential principle of all recreation must be that of variety of organic activity; for variety of organic activity merely means the substitution of one set of organic activities for another, and, consequently, the successive affording of rest to bodily structures as they are successively exhausted. The undergraduate finds recreation in rowing because it gives his brain time to recover its exhausted energies, while the historian and the man of science find recreation in each other's labours because these labours require somewhat different faculties of mind for their pursuance.

Before concluding these general remarks on the physiology of recreation, I must say a few words with more special reference to the physiology of exercise. We do not require science to teach us that the most lucrative form of recreation for those whose labour is not of a bodily kind is muscular exercise. Why this should be so is sufficiently obvious. The movement of blood in the veins is due to two causes. The act of drawing breath into the lungs by dilating the closed cavity of the chest serves also to draw venous blood into the heart. This cause of the onward movement of blood in the veins is what is called aspiration; and it occurs also in some of the larger veins of the limbs, which are so situated with reference to their supplying branches that movement of the limbs determines suction of the blood from the supplying branches *to the veins.* The second great cause of the venous flow is as follows :—The larger veins are nearly all provided with valves which open to allow the blood to pass on towards the heart, but close against the blood if it endeavours to return towards the capillaries. Now the larger veins are embedded in muscles, so that the effect of muscular contractions is to compress numberless veins now in one part and now in another part of their length; and, as each vein is thus compressed, its contained fluid is, of course, driven forwards from valve to valve. Hence, as all the veins of the body end in the heart, the total effect of general muscular activity is greatly to increase the flow of venous blood into the heart. The heart is thus stimulated to greater activity in order to avoid being gorged with the unusual inflow of blood. So great is the increase of the heart's activity that is required to meet this sudden demand on its powers of propulsion that every one can feel in his own person how greatly muscular exercise increases the number of the heart's contractions. Now the result of this increase of the heart's activity is, of course, to pump a correspondingly greater amount of blood into the arteries, and so to quicken the circulation all over the body. This, in turn, gives rise to a greater amount of tissue-change,—oxygenation, nutrition, and drainage,—which, together with the increased discharge of carbonic acid by the muscles during their time of increased activity, has the effect of unduly charging the blood with carbonic acid and other effete materials. This increased amount of carbonic acid in the blood stimulates the respiratory centre in the spinal cord to increase the frequency of the respiratory movements, so that under the influence of violent and sustained exercise we become, as it is expressively said, 'out of breath.' The distress to which this condition may give rise is, however, chiefly due to the heart being unable to deliver blood into the arteries as quickly as it receives blood from the veins; the result being a more or less undue pressure of venous blood upon a heart already struggling to its utmost to pump on all the blood it can. Training, which is chiefly systematic exercise, by promoting a healthy concordant action between the heart and arteries, diminishes the resistance which the latter offer to an unusual flow of blood from the former, and therefore men in training, or men accustomed to bodily exercise, do not so easily become distressed by sustained muscular exertion.

Now it is evident, without comment, how immense must be the benefit of muscular exercise. Not only does it allow time for the brain to rest when exhausted by mental work, but, by increasing the circulation all over the body, it promotes the threefold function of oxygenation, nutrition, and drainage. It thus refreshes the whole organism in all its parts; it increases by use the strength and endurance of the muscles; it maintains the heart and the lungs—or rather the whole of the circulatory and respiratory mechanisms—at the highest point of their natural efficiency; and, in general, next only to air, food, and muscular exercise, is of all things most essential to the vitality of the organism.

So much, then, for the physiology of recreation; and, having said this much on the abstract principles of our subject, I shall devote the rest of my lecture to a consideration of this subject in its more practical aspects.

The fundamental principle of all recreation consisting, as I have said, in the rest from local exhaustion which is secured by a change of organic activity, it is clear that practical advice with regard to recreation must differ widely according to the class, and even the individual, to which it is given. Thus it would be clearly absurd to recommend a literary man, already jaded with mental work, to adopt as his means of recreation some sedentary form of amusement; while it would be no less absurd to recommend a working man, already fatigued with bodily toil, to regale himself with athletics. And, in lower degrees, the kind and amount of recreation which it would be wise to recommend must differ with different individuals in the same class of society according to their age, sex, temperament, pursuits, and previous habits of life. But, although all matters of detail thus require to be adjusted to individual cases, there is one practical consideration which applies equally to all cases, and which must never be lost sight of, if recreation of any kind is to produce its full measure of result.

This consideration is the all-important part which is played in recreation by the emotions. It is, I am sure, impossible to over-estimate the value of the emotions in this connexion—a prolonged flow of happy feelings doing more to brace up the system for work than any other influence operating for a similar length of time. The physiological reasons why this should be so are not apparent; for, although we know that the emotions have a very powerful influence in stimulating the nerves which act on the various secreting organs of the body, I do not think that this fact alone is sufficient to explain the high value of pleasurable emotions in refreshing the nervous system. There must be some further reason—probably to be sought for within the limits of the nervous system itself—why a flow of happy feelings serves to re-create the nervous energies. But, be the reasons what they may, we must never neglect to remember the fact that the influence of all others most detrimental to recreation is the absence of agreeable emotions or the presence of painful ones. There is, for instance, comparatively little use in taking so-called constitutional exercise at stated times, if the mind during these times is emotionally colourless, or, still worse, aching with sorrow and care. If recreation is to be of good quality, it must before all things be of a kind to stimulate pleasurable feelings, and while it lasts it ought to engross the whole of our consciousness. Half-hearted action is quite as little remunerative here as elsewhere; and, if we desire to work well, no less in play than in work must we fulfil the saying, 'What thy hand findeth to do, do it with thy might.'

Having stated this practical principle as of paramount importance in all recreation, I shall devote the rest of my lecture to giving a variety of suggestions concerning the recreation of all classes of society; and, for the sake of securing method to my discussion, I shall primarily consider the community in its most natural classes of men, women, and children.

There is not much to be said on the recreation of men belonging to the upper classes. That most objectionable of creatures, the gentleman at large without occupation, has a free choice before him of every amusement that the world has to give; but one thing he is hopelessly denied—the keen enjoyment of recreation. Living from year to year in a round of varied pastimes, he becomes slowly incapacitated from forming habits of work, while at the same time he is slowly sapping all the enjoyment from play. For, although variety of amusement may please for a time, it is notorious that it cannot do so indefinitely. The intellectual changes which are involved in changes of amusement are not sufficiently pronounced to re-create even the faculties on which the sense of amusement depends; the mind, therefore, becomes surfeited with amusement of all kinds, just as it may become surfeited with a tune too constantly played—even though the tune be played in frequently changing keys. For such men, if past middle life, I have no advice to give. They have placed themselves beyond the possibility of finding recreation, and their only use in the world is to show the doom of idleness. They, more even than paupers, are the parasites of the social organism; and we can scarcely regret that their lumpish life, being one of stagnation self-induced, should be one of miserable failure, to the wretchedness of which we can extend no hope.

Turning next to gentlemen of active pursuits, I may most fitly deal first with those who are beginning life at the universities. At our larger universities both the provisions for recreation and the manner in which they are used are in a high degree satisfactory, and ought to serve as a model to universities all over the world. It may be true that at the Continental universities rowing would not inspire a tenth part of the enthusiasm which it creates at Oxford and Cambridge; and I know from experience that it is hopeless to persuade German students, as a class, to adopt what they consider childish toys—the bats and balls of cricket. All I can say is, so much the worse for the Continental universities. In everything that appertains to work—and more especially to original work—I am profoundly convinced that the sooner we copy something from the German universities the better; but in most things that appertain to play the English universities constitute the best models. Rowing, cricket, football, athletics, and in a lower degree gymnastics, bicycling, swimming, and riding, constitute, besides walking, the favourite modes of exercise; and it is impossible to suggest better. I have only to object that, regarded as recreation, there is, both at Oxford and Cambridge, far too much tendency to a specialization of these forms of exercise. Competition dictates practice, and practice entails too exclusive a devotion to the one kind of exercise which is practised; so that, as a consequence, there is too sharp a division between the boating men, the cricketers, and the athletes, for securing the full benefit of exercise which all would derive if they were more usually to participate in one another's pursuits. But this evil is to some extent unavoidable, as it arises immediately from the spirit of emulation, without which the mere exercise would lose its zest, and so the fullness of its recreative value. Still, now that so many of the colleges are provided with their own cricket-grounds, and the boats are practically open to all, there is no reason why even the most ambitious aspirants to the ''varsity blue' should not enjoy more variety of exercise than is usually the case.

In the army and navy there is abundant time for recreation, which is too frequently wasted in mere lounging. When once the army or navy examinations are passed, there is comparatively little mental work required in the performance of duty, and therefore the comparatively large amount of leisure time which officers enjoy ought to be much more generally devoted than it is to reading or even to original work. Officers are a class which presents no small proportion of intelligent members; so that the comparative rareness with which they exhibit either high culture or proved powers of original work must, I think, be set down to a general bad habit or fashion of substituting idle amusement for profitable recreation.

To professional men, men of business, and indeed all who are engaged in pursuits requiring more or less severe mental work, coupled with more or less confinement, exercise is, of course, the *conditio sine quâ non* of the recreation to be recommended. This fact is so obvious that I need not dwell upon it further than to make one remark. This is to warn all such persons that their feelings are no safe guide as to the amount of muscular exercise that is requisite for maintaining full and *sustained* health. By habitual neglect of sufficient exercise the system may and does accommodate itself to such neglect; so that not only may the desire for exercise cease to be a fair measure of its need, but positive exhaustion may attend a much smaller amount of exercise than is necessary to long continuance of sound health. However strong and well, therefore, a man may feel notwithstanding his neglect of exercise, he ought to remember that he is playing a most dangerous game; and that sooner or later his sin will find him out, in the form either of dyspepsia, liver, kidney, or other disease, which so surely creep upon the offender against Nature's laws of health.

According to Dr. Parkes the amount of exercise that a healthy man ought to take without fatigue is at the least 150 foot-tons per diem. This, in mere walking, would, in the case of a man of ordinary weight, be represented by a walk of between eight and nine miles; but it is desirable that the requisite amount of exercise should be obtained without throwing all the work upon one set of muscles. For this reason walking ought to be varied with rowing, riding, active games, and, where practicable, hunting or shooting; which, to those who are fond of sport, constitute the most perfect form of recreative exercise.

Turning next to all the large class of working men, their possible means of recreation are alike in this—that they must be more or less of a corporate kind. These men depend for their recreation on public institutions, and therefore it is of the first importance to the national health, happiness, morals, and intelligence that no thought, pains, or money should be spared in providing such institutions, adequate in number and competent in character, to meet so important and so immense a need. Within the limits of so general a lecture it is impossible to do anything like justice to this subject; but I may say a few words on the kinds of institutions that I should most like to recommend.

Every town the size of which is so considerable that green grass and fresh air are not within easy reach of all its inhabitants ought at any expense to be provided with public parks. In many of our large towns it is now virtually impracticable to provide such parks in central situations; but even suburban parks are infinitely better than no parks at all. Public recreation grounds having been provided, every inducement ought to be added to attract the people to use them. Gymnasia, boating, cricket and golf implements, lawn-tennis, and tennis-courts ought all to be supplied at the public expense, so that working men and boys might be able to spend their holidays and half-holidays in healthy out-door amusement without requiring to incur the expense of club subscriptions. Out-door clubs, however, ought none the less to be encouraged for the sake of the additional inducement which *esprit de corps* and competition give to out-door recreation—the club subscriptions being limited to the providing of prizes. Bands ought also to be provided at the public expense to play in the parks during the spring and summer months on the afternoons of holidays and Sundays. The importance of this latter provision cannot be too highly rated; for experience shows that wherever it has been tried its success has been astonishing. For instance, Lord Thurlow, quoting from Sir Benjamin Hall, stated to the House of Lords on May 5 'that the Sunday visitors to Kensington Gardens had, by the band playing there, been increased from 7,000 to 80,000 in one day; and in the Regent's and Victoria Parks 190,000 had been attracted by the bands in one afternoon.' When we consider what an amount of health, happiness, and refining influence these numbers represent as produced by a single cause, we blush for the narrow fanaticism which, in the name of religion, does all it can to deny to the working classes the elevating influence of music on the only day that the toil of life admits of their obtaining it. I hold it to be impossible too strongly to deprecate the downright immorality of driving the working classes by thousands into the pot-houses by depriving them of the innocent and refining enjoyment of music in the open air. Surely the common sense of the public as a whole is not so degraded by bigotry that, in the face of the figures I have quoted, there can any longer be a question in the public mind on the positive sin of allowing a puritanical spirit in the few to domineer over the health, the happiness, and the morals of the many.

Somewhat similar remarks apply to the question of opening museums and art galleries on Sundays, though on this question the sabbatarians include among their ranks a greater proportional number of the community. In the debate of May 5, to which I have already alluded, both Church and State, in so far as they are represented in the persons of the Primate and the Premier, spoke strongly against any reform in this direction; and, perhaps owing to this weight of united authority, the proposed reform was negatived by a majority of eight. Yet, when we examine the arguments which these high authorities were able to produce, we find them to be conspicuously of the feeblest kind. The leading argument both of the Prime Minister and of the Archbishop was that there is not sufficient evidence 'of a very predominant sentiment' in favour of the reform on the part of working men themselves. Now to this it may be answered, in the first place, that a poll on the question has not been taken, and that, therefore, it is a mere begging of the question to say that working men as a class 'in all probability' do not desire the change. But, even if we grant that the working classes as a whole are as apathetic upon the subject as they are represented to be, I do not see that this is any valid reason against reform. Possibly enough the members of the House of Lords have a higher appreciation of the value of science museums and art galleries, as well as the privileges and advantages of entering them, than have the members of working men's clubs; and I doubt not that, if the upper and the lower classes were for a few months to change places, petitions to Parliament of the kind which Lord Thurlow presented would be more numerous and more generally signed. But what does this argue? Surely not that we, who best know the culturing value of these institutions, ought to use the comparative ignorance of those who do not, as an argument against extending to them the opportunity of ascertaining that value. On the contrary, in whatever degree indifference of the working classes in this matter can be proved, it would seem to me a strong argument in favour of instilling into them a more lively perception of the educational advantages of such institutions; and this can only be done by throwing open these institutions on what is virtually the only day in the week when the classes in question are able to visit them. Of course it may be said that the alleged indifference arises, not from ignorance of the value of such institutions, but from a preponderant sense of sabbatarianism on the part of the working classes. But, supposing the alleged apathy to exist, and supposing it to arise from the latter cause alone—which I deem highly improbable—I still think it would constitute no valid argument against the proposed reform. We are all, I take it, agreed upon the recreative as well as what Lord Beaconsfield called the civilizing influence of the institutions in question; so that, upon the suppositions which I have made, the only issue to be considered is as to whether these benefits would be more than counterbalanced by the evil of offending the sense of sabbatarianism which is assumed so largely to predominate among the working classes. And this introduces us to the second and only other argument which was adduced by Lord Beaconsfield. He said: 'In all questions into which the religious sentiment enters, it is highly desirable that no change should be effected that is not called for by the expression of a very predominant sentiment on the part of the people.' If this means that legislation ought not to interfere aggressively with the religious sentiments of the many, it is, no doubt, a proper utterance; but if it means that the socially harmless and even beneficial recreation of the many is to be prohibited by the particular religious sentiments of the few—and this is what it must mean if the words are taken to mean what they say—then I think the utterance is most improper. The idea which underlies this utterance seems to be that the religious sentiment is of so much value to the State that it ought to be tenderly fostered in all its ramifications, even to the extent of preventing reforms conceded to be beneficial lest they should prune the twigs of the structure thus tenderly fostered. Now I do not wish to enter on the question as to how far the religious sentiment is of value to the State; for I think it is quite obvious in the present case that, let us place this value as high as we choose, the contemplated reform cannot be other than completely beneficial. The working men who prefer spending their Sundays at home would not be injured by their brothers visiting museums and art galleries; while, in so far as the religious sentiment is concerned, it ought to be a matter of gratification to all who entertain it that those working men who do not prefer spending their Sundays at home would, by the opening of such institutions, have an inducement supplied to turn their backs upon the beer-shops, and to bring their families to see the things of interest in Nature or the things of beauty in Art. It is not that the opening of the institutions in question would act as a counter-inducement to that which is held out by the churches. Working men who are in the habit of going to church will, in any case, continue going to church, even though some of them may also spend their Sunday afternoons in the museums and galleries. And, so far as recreation is concerned, I am inclined to think it is not desirable that there should be any antagonism offered to the inducement which is held out by the churches. For I am inclined to think that the class of emotions which public worship arouses in a religious mind are of a high recreative value; and so, as a mere matter of sanitary interest, I should be sorry to see the churches interfered with by other institutions of a less recreative kind. But in the present instance the antagonism should not be museums and galleries *versus* chapels and churches, but museums and galleries *versus* public-houses and all places of loitering idleness; and any 'religious sentiment' that seeks to oppose the introduction of such an antagonism can only be pronounced immoral.

Two other arguments against the reform were adduced in the debate, neither of which possesses the smallest validity. The Archbishop of Canterbury argued: 'What were their lordships called upon to do to-night? It was, before the eyes of the people of this kingdom, to pronounce a deliberate opinion that the policy with regard to the observance of the Sunday hitherto pursued in this country had been a mistake. . . . If any change were made, there was great danger of the day of rest being lost, as it would be the thin edge of the wedge to the introduction of other changes of a more advanced kind.' Now this is an argument which may always be adduced against any proposed reform, however obvious the need. We must not make the change because, by so doing, we should condemn the policy of the past and lead the way to further changes in the future. But, if a change is seen in itself to be desirable, such hypertrophied conservatism as this ought not to be allowed to obstruct progress. Moreover, in the present instance I am persuaded that the fears for the future are groundless. There is no necessary or even remote connexion between art galleries and music-halls; and, so long as 'the religious sentiments' in this country remain what they are, neither religion nor reason will be able to trace a similarity or a precedent that does not exist.

The other argument to which I have alluded is, that the opening of museums and galleries on Sundays would entail a certain amount of Sunday work on the part of porters, &c. To this argument it is sufficient to reply, in the first place, that, if desirable, voluntary labour of so light a kind would be forthcoming; and, next, in the words of the Earl of Derby: 'He did not deny the extreme importance of maintaining the day of national rest; but they must recollect that, wherever recreation was allowed, some labour must be thrown on those who provided it. They permitted excursion trains, . . . &c., . . . and on the whole there *was a great preponderance of advantage over disadvantage.'* As in most museums and galleries the porters and other servants employed on Sundays would probably not amount to one half per cent. of the visitors who would profit by their labour, I think that the argument may in this, more than in any other case of Sunday work, be set aside as absurd.

I have been tempted to dwell thus at considerable length on the question of Sunday recreation, because it is one that is now prominently before the public, and therefore I hope that a few words in season may help to hasten a reform which sooner or later is inevitable. As regards the recreation of working men, I have only further to say that institutions on the model of working men's clubs deserve to be encouraged in every possible way. Wealthy and benevolent persons could not do better with their means than to found such clubs where most required, and to endow them with a small annuity which would serve as a nucleus to club subscriptions, a greater number of subscribers being ensured by the smaller amount of the fees. The Volunteer movement also deserves every encouragement, as supplying exercise and recreation to all classes at a very moderate cost.

Turning next to the recreation of women, I shall begin, as in the case of men, with the upper classes. And here, for the sake of emphasis, I shall confine my remarks to the one topic of muscular exercise.

For ladies, more than any other section of the community, have fallen into the habit of neglecting exercise, and I am sure that I cannot draw too dreadful a picture of the consequences which here arise from the too general custom. These consequences are all the more to be feared because many of them are of so insidious a kind that the root of the evil may never be suspected. It is not my intention to frighten any of you by unfolding a tale of horrors; so I will only say, in general terms, that I am quite sure that among ladies there is no one source of disease and early death more prevalent than is this habitual violation of the best known among the laws of health. Consider for a moment what the life of a lady in town usually is. She rises probably at nine or ten o'clock, without much appetite for breakfast. Till luncheon she remains indoors, reading a novel or magazine, writing letters, or attending to her household duties. After luncheon she takes a little 'carriage exercise'—observe the unconscious irony of the term—pays a few afternoon calls, and returns home to afternoon tea. Until it is time to be dressed for dinner, there is another period of total quiescence, and the tedious operations of the dressing-room which follow are certainly the reverse of recreation. Dinner in pleasant company no doubt affords recreation of a mental kind were such recreation required, which, in this case, it certainly is not. After dinner, during the season, she probably receives an evening party, goes to the opera, or indulges in some other kind of amusement which keeps her in hot rooms with vitiated air till the small hours of the morning. At last she retires to rest, complaining that her delicacy of constitution makes her a martyr to head-aches, languid circulation, lassitude, and feelings of sickness. Now contrast such a wholly unnatural state of things with the daily life of a country girl to whom exercise is felt to be a *sine quâ non* of existence, and do not wonder at the contrast between her state of blooming health and the feeble stamina of the lady whose position requires her to adopt the habits of town life. You may say that these remarks are trite, and that you all knew before the desirability of taking exercise. I can only reply:—If ye know these things, happy are ye if you do them. And why not do them? Why not make the duty of taking daily exercise as important an article in your social creed as the duty of returning calls? If you say there is no time, the answer is preposterous. Senior wranglers could never have been senior wranglers had they not found time for their pull upon the Cam; and by not making time for exercise you are merely shortening the time of your life. Every day you can easily find time for a ride; or, if you are not able to ride, you may take every day a two hours' walk with some companion or object to make it a pleasurable walk. Such companions and objects are not difficult to obtain in the town; and in the country there are several kinds of out-door amusements—such as rowing, riding, skating, lawn-tennis, &c.—which are happily recognized by the stern laws of etiquette as suitable for ladies, and which in the performance are singularly graceful as well as highly conducive to good spirits. Dancing is also in itself an admirable form of exercise, though its beneficial effects are usually much more than counteracted by the late hours and excessive exhaustion of the ball-room. This excessive exhaustion of the muscular, but more especially of the nervous, energies, may, in this as in all other similar cases, be properly denoted by the term which is the correlative of recreation—viz. dissipation. For although it has become customary to restrict the application of this term only to extreme cases, and to apply it to less extreme cases merely as a joke, both in etymology and in physiology the term dissipation is alike appropriate to all degrees of wasteful expenditure of the vital energies.

In recommending bodily exercise thus strongly, I speak of course to young and to middle-aged ladies; but I am sure that even here there are very few who could walk their five or six miles a day without fatigue. This merely shows to what a state of enervation this habitual neglect of exercise has reduced them. Such enfeebled persons ought to begin at once to give their constitutions some chance of recovery; they ought regularly to take as much exercise as they can endure without distressing fatigue; and in a few months they would be surprised to find how greatly the length of their walks may be increased, and with what immense benefit they are attended.

Women in the lower classes of society may to a large extent share in the recreation of their male relatives; and I feel confident that the more those kinds of recreation are encouraged which invite participation by both sexes the better. Great additional enjoyment is infused into a holiday if it can be spent in company with those most near and dear; the heart is then most open to the best influences of affection, and family ties are closest drawn in hours of happiness together. Such institutions as the Crystal and Alexandra Palaces, where a variety of amusements are provided at a cheap cost in country air and amid aesthetic surroundings, constitute the best type of institutions for the healthy and improving recreation of both sexes and all ages. Of parks and public pleasure-gardens I have already spoken, and the desirability of preserving commons and heaths in the near neighbourhood of large towns is generally recognized. I will only add that no time ought to be lost in promoting the suggestion recently made to the First Commissioner of Public Works by the National Sunday League—viz. that, in all such places of public resort, harmless refreshments ought to be plentifully provided. As a type of more strictly town recreation, that which is afforded by the Zoological Gardens deserves honourable mention, and the sustained popularity of the Moore and Burgess Minstrels' entertainment goes far to indicate that a much more healthy tone might be given to the entertainments which are generally provided by music-halls. Now that Cremorne Gardens, the Argyll Rooms, and similar places of public resort are being closed, there is certain to be a greater pressure of vice thrown upon the music-halls, and the increased demand for low, quasi-immoral entertainments which will thus be set up is *only* too certain to be supplied. It is greatly to be deplored that, excepting the 'gods' galleries in theatres, there are now scarcely any places where respectable women of the lower classes can witness a public entertainment that is not more or less of a degrading kind. Philanthropists would do well to start in London several People's Theatres, where amusing dramas, part-singing, and other forms of innocent entertainment, would be sufficiently attractive to render the theatres self-supporting. I have no doubt that, if this were done, there would be a very marked distinction between the character of the audiences attending such theatres and that of the audiences which now attend the music-halls.

Before quitting the class of working women, I must put in a good word for penny readings, mothers' meetings, window gardening; and last, though not least, I should like to recommend some general and definite system for the loaning of books at a nominal cost.

Coming now to that large and important class—children. It seems a mere commonplace to say that children ought to be allowed to run about and romp and play as much as ever they like or can. Yet this commonplace is far from having a common place in the usages of modern society. Among the upper classes children are much too frequently restrained from taking their full amount of natural play, either by preposterous ideas of genteel decorum, or by the respect due to expensive clothing; while among the lower classes the playground is too often restricted to the limits of the gutter, and even in the parks we too often witness the melancholy spectacle of children still a long way from their teens acting the part of nurse to still younger members of the family. To remedy these evils in the case of the upper classes there is nothing to suggest, except that fathers and mothers should cease to regard their children's clothes as of more importance than their children's health, and learn to estimate at its due value the responsibility of fostering the most precious of their possessions—these living, feeling, loving little ones whose capacities of life-long happiness are being moulded by their parents' wisdom or destroyed by their parents' folly. In the case of the lower classes, the crèche, or public nursery, where abundance of romping play is permitted, deserves the most strenuous encouragement. Children of all classes will play as they ought to play if only Nature is allowed to have her course without let or hindrance from artificial restraints.

But, as the only object in rearing children is not that of making them healthy animals, some amount of artificial restraint is necessary when the time for systematic mental training arrives. Nevertheless, as bodily health is the most essential condition, even to mental training, the most fundamental principle which ought to guide the latter is that of supplying it with the minimum of cost to the former. Yet in school life this fundamental principle is almost universally disregarded. So long as the general health of a school is maintained at a level compatible with work, and not below the level that declares itself by conspicuous 'breakdowns,' so long nobody cares to reflect whether the system of school discipline is in all particulars the best for maintaining the general health at the highest possible level. I will not wait to consider the disgraceful food which, even in many of our better-class schools, is deemed sufficiently good for growing children to thrive upon; nor will I wait to inveigh against the system of competition which, when encouraged beyond moderate limits, acts as a baleful stimulus to the very pupils who least require to be stimulated. But, confining my remarks to the one particular of punishment, I should like to put it to you, as a question of common sense, whether it would be possible to devise any mode of punishing school children at once more fatuous, more pernicious, or more opposed to every principle of science and morality, than are the modes which are now most generally in vogue. Consider for a moment the practice of giving 'impositions.' It is not supposed that copying out a stated number of lines is an economical way of gaining information, so that even the plea of imparting instruction cannot be advanced as a benefit to compensate the evil of the method. And this evil is a very serious one. The object of all our methods in education ought to be, as much as possible, to economize effort; the mental energies ought, as it were, to be nursed, so that by their exercise they should lay up the largest possible store of information. But the mental energy which is expended in writing out an imposition is wholly, or almost wholly, profitless; and the amount of energy so expended is considerable—especially in the case of long impositions. For the whole punishment of writing out an imposition consists in the *tediousness* of the process; and tediousness, by the painful class of emotions which it arouses, is the most wearisome or exhausting of the influences that consume the nervous energies. It may therefore be said that, in whatever degree the writing of an imposition is a punishment, in that degree are the nervous energies dissipated in a wholly useless manner. Therefore, to say nothing of the actual time that is wasted in the writing of impositions, or of the slovenly style of handwriting which this mode of punishment induces, my great objection to the mode of punishment is that, by consuming the nervous energies in a wholly profitless manner, it stands in direct antagonism with all the principles that I am endeavouring to inculcate. And still more foolishly wrong does this method of punishment become when it is united, as it generally is, with another and still more objectionable method—I mean the custom of imprisoning children during playtime with the express purpose of denying them healthful recreation. To shut up a child already weary with work in an empty schoolroom under a depressing sense of disgrace is something worse than cruel; to the child it is a wrongful injury that does not admit of being justified by any argument; and, in running counter to all the principles both of physiology and of education, it is a sin against society. In most cases the time during which a child is thus confined is the only time in the twenty-four hours that there is an opportunity afforded for any recreation at all; so that, when the weary time of solitude is over and school again meets, the unfortunate victim resumes work with energies doubly exhausted. Even if a child had the stamina of a man it would be impossible that mental work resumed under such circumstances could be profitable, the faculty of memory being quickly affected by mental fatigue. But, as a matter of fact, owing to the great rapidity of physiological changes in a growing organism, a child has much more need of frequent exercise than has an adult; so that, whether we look at the matter from a sanitary or from an educational point of view, I think it is impossible too strongly to condemn the practice of confining school children during playtime.

Of course I shall be asked what modes of punishment I should suggest as substitutes for the two which I have thus so strongly condemned. This question, however, I am not careful to answer. Even if it be true that there is a difficulty in providing other and efficient modes of punishment, this does not in my opinion justify the maintenance of modes that are so clearly injurious. But, merely for the sake of giving an answer, I may say that, in the case of girls, experience derived from many of the higher-class schools shows that discipline may be maintained, either without any punishment at all, or else by such kinds as are more nominal than real. The difficulty in the case of boys is no doubt greater, but not, I think, insurmountable. Many kinds of punishment may here be devised, which go upon the principle, not of denying muscular exercise, but of enforcing it. Extra drills or other compulsory exercise during play-hours are modes of punishment greatly to be preferred to those involving sedentary confinement, although I do not pretend to insinuate that compulsory exercise in the way of punishment has the same recreative value as voluntary exercise in the way of play. For my own part, I have no hesitation in recommending corporal punishment as on all grounds greatly preferable to the protracted, tedious, heart-sickening, and health-breaking systems which, in the name of Humanity, are coming more and more into general use. But, however great the difficulty of devising or substituting other modes of punishment may be, I feel sure there can be no reasonable doubt that the modes which are at present so largely in fashion ought to be universally abolished.

The above remarks of course apply almost exclusively to boys' schools; and, looking to boys' schools as a whole, nothing much more remains to be said of them in connexion with recreation. The John Bull spirit of this country is in favour of allowing schoolboys to play the hardy and vigorous games which require all the muscles to be brought into active service. The case, however, is widely different in girls' schools; so, before concluding, I should like to add a few words with special reference to them.

School-life is the time when, most of all, healthful recreation is needed. It is then that the organism, being in a state of active growth, most requires the purifying and strengthening influences of muscular exercise to be in frequent operation; and the development which the organism, during the years of its growth, receives, is carried through its life as an unalterable possession. Yet in the majority of girls' schools how miserable is the provision that is made for securing this development! Even in our higher-class schools the whole mechanism of their discipline seems to be devised with the view of checking the healthful flow of natural joyousness by the barriers of tedious monotony. On all sides a schoolgirl is shut up in a very prison-house of decorum; every healthful amusement is denied her as 'unladylike'; she is imperatively taught to curb her youthful spirits in so far as these may sometimes be able to struggle above the weight of a mistaken discipline; she is nurtured during her growth on the unhealthy soil of *ennui* in a depressing atmosphere of dullness; and, as too frequent a consequence, she leaves school with a sickly and enervated constitution, capable, perhaps, of high vivacity for a short time, but speedily collapsing under the strain of a few hours of bodily or mental activity. Now all this is the precise reverse of what school-life ought to be. The only aim of most of the higher girls' schools seems to be that of turning out pupils with a superficial knowledge of a variety of subjects, with such accomplishments as they may be able, by hard practice, to acquire, and with a well-drilled sense of the part that a young lady is to play in the complicated tragedy of etiquette. Now it is no doubt sufficiently desirable that girls, and especially young ladies, should be well educated; but, in my opinion, it is of far greater importance that schoolgirls should leave school with the maximum of bodily vigour that a wise and judicious nurture can impart than that they should do so with minds educated to any level that you please to name within the limits of natural possibility. I should, therefore, like to see all girls' schools professedly regarded as places of recreation no less than as places of education—as places of bodily, no less than as places of mental, culture. And, if you consider this too strong a statement of the case, you must at least allow that far more permanently beneficial work would be done by girls, both at school and after they leave it, if more permanently beneficial play were allowed. At present in most schools all indoor romping is sternly forbidden as unladylike, all outdoor games being regarded as impossible recreations for girls of their age and social position; the unfortunate prisoners are restricted in their exercise to a properly prison-like routine—a daily walk in twos and twos, all bound by the stiff chains of conventionality, with nothing to relieve the dull monotony of the well-known way, and one's constant companion being determined, not by any entertaining suitability of temperament, but by an accidental suitability of height. Could there be devised a more ludicrous caricature of all that we mean by recreation?

Do you want to know the remedy? The remedy is as simple as the abuse is patent. Let every school whose situation permits be provided with a good playground, and let every form of outdoor amusement be encouraged to the utmost. Schools situated in towns, and, therefore, unable to provide private playgrounds, might club together and rent a joint playground—care, of course, being taken that the social standing of all the schools which so club together should be about equal. Some such arrangement would soon be arrived at by town schools if parents generally would bestow more thought on the importance of their children's health, and turn a deaf ear to all the qualifications of a school, however good, which does not provide for the proper recreation of its pupils.

Of course I shall be met by the objection that, by encouraging active outdoor games among schoolgirls, we should rub off the bloom, so to speak, of refinement, and that, as a result, we should tend to impair the delicate growth of that which we all recognize as of paramount value in education—good breeding. I can only say I am fully persuaded, by the results I have seen, that such would not be the case. The feelings and the manners of a lady are imparted by inheritance and by the society in which she lives, and no amount of drilling by schoolmistresses will produce more than an artificial imitation of the natural reality. Therefore, once let a girls' school be a little society of little ladies, and you need never fear that active play, natural to their age and essential to their health, will make them less ladylike than does the stiff restraint of the present system. Rather would active play, during the years of bodily growth, by developing the co-ordinated use of all the muscles, tend to impart through after-life that grace of easy movement which we all admire, but the secret of which is truly revealed only to the children of nature.

So much, then, for bodily recreation in girls' schools. As regards their mental recreation, I should begin by recommending less mental work. In most of the higher-class girls' schools, as in boys' schools, a great deal more work is required than it is either judicious or desirable to require.

The root of this evil is that a girl's education is usually made to terminate at the age of seventeen or eighteen, and, as a consequence, she is expected to gain during these early years of life a sufficient amount of book-learning to serve for the rest of her days. In many cases it is, no doubt, unavoidable that a girl's education should end when she leaves school; but I think that in all cases education ought to be less arduous than it is in many of our girls' schools. Even if education is to end with school-life, it is better that it should end with a little knowledge, thoroughly acquired, than with a confused and half-forgotten medley of many subjects. Not that I advocate speciality and depth of knowledge for girls. On the contrary, I think that the aim here ought rather to be that of generality and width—languages, elementary mathematics, geography, history, art, science, and English literature being all taught, but taught superficially, or without much detail, and in as entertaining a manner as possible. The point, however, which I desire chiefly to insist upon is this, that schoolgirls ought not to be made or encouraged to work beyond their strength. In most girls' schools competition runs very high; and I am quite sure that in very many cases the aim of the schoolmistress ought to be to check its undue severity rather than to stimulate that severity by competitive examinations. I have myself known many cases of girls sitting up late, rising early, and working all day to win their coveted prizes—a state of things which is a sufficiently crying evil in boys' schools, but which is a still worse evil in girls'—worse because the *physique* of a girl is usually less robust than that of a boy, and because the schoolgirl is doomed to less outdoor exercise.

Now, if less time were consumed in girls' schools by mental work, more time would be allowed for mental as well as for bodily recreation. And, if the time thus gained were judiciously expended, I believe that, even as a matter of mental culture, more would be gained than lost. Suppose, for instance, that some time in every day were set apart for mental occupation of a voluntary kind—a good library of general though selected literature being provided for the use of the pupils, and the cultivation of art being allowed to rank as 'mental occupation.' In this way the more intellectual of the pupils would be able to receive that culture which only general reading can impart, the more artistic would be able to improve themselves in their art by additional practice, and even the unstudiously disposed would find in a standard novel a kind of reading less distasteful than Euclid.

And here, while treating of mental recreation among girls, I may add that school-life is the time when provision ought to be made for mental recreation in after-life. Be it observed that mental recreation is impossible unless there is a natural and, more or less, cultured taste for some branch or branches of mental work. Indeed the capacity for such recreation is clearly proportional to the degree of such culture, an idea-less mind being incapacitated from obtaining any variety of ideas. Hence the great importance of width of cultured interest, and the consequent duty of the heads of schools to ascertain the mental predilections of their pupils individually, and, in each case where such a predilection is apparent, to bestow special attention on its culture. If this were general, I am convinced that the gain to their pupils in after-life would be enormous. We are living in a world teeming with interest on every side, but to make this interest our own possession we require a trained intelligence. It ought, therefore, to be one of the first aims of education to supply special training to special aptitudes, whereby the mind may be brought *en rapport* with the things in which it is by nature fitted to take most interest, and so in them to find a never-ending source of mental recreation. If this method were more universally adopted in girls' schools, ladies, as a rule, would be supplied with more internal resources of mental activity, and cease to be so dependent, for the stimulation of such activity, on the mere excitement which is supplied by the external resources of society. But as it is, whether in the concert room, the picture gallery, the library, or the country walk, it is of most ladies literally and lamentably true that having eyes they see not, and having ears they hear not, neither understand. Most ladies have a natural taste for some one or other of the many lines of intellectual activity; and if this taste were developed in early life it would grow with the knowledge on which it feeds, till in mature life it would become an unfailing source of pleasurable recreation. Yet in most cases such a taste in early life is not so much as discovered. How seldom it is, that we meet, even among musical ladies, with any knowledge of harmony!—and this simply because they have never ascertained whether the study of harmony might not be to them a study of absorbing interest. Or, again, how very rare a thing it is to meet a lady who has even a superficial acquaintance with any one of the sciences, and how vast is the paradise of intellectual enjoyment from which multitudes of intelligent ladies are thus excluded! And similarly with all the other lines of intellectual pursuit for which a certain small amount of rudimentary initiation is required in order to ascertain whether they are suited to individual taste. So that, as I have said, one of the most important aims of a girl's, and also of a boy's, education ought to be to ascertain and specially to cultivate the branch of knowledge in which most interest is taken. Do not suppose that by following this advice there is any danger of imparting to young ladies that singularly objectionable and not very easily definable character which is most tersely and intelligibly conveyed by the word 'blue.' No one can have a more intense dislike than I have of the cerulean tint;

but, wherever I have seen it, I have always been persuaded that it is the previous character which has tinted the learning—not the learning which had tinted the character. Only let a lady be a lady, and nothing but envious ignorance can ever venture to breathe the objectionable word, while cultured refinement in the opposite sex will always discover in the culture of a lady that only which adds to her refinement.

I have now said all that I feel it desirable to say on the *principles* and the *practice* of *recreation*; and I will conclude by adding a few words on what may be called the ethics of recreation.

Health may be taken as implying capacity for work, as well as, to a large, though to a less absolute, degree, the capacity for happiness; and, as duty means our obligation to promote the general happiness, it follows that in no connexion is the voice of duty more urgent than it is in the advancement of all that is conducive to health. By maintaining our own health at the highest point of its natural efficiency, we are doing all that in us lies to secure for ourselves the prime condition for work—that is, the prime condition for benefiting the community to whatever extent our powers may be capable. And, similarly, by promoting the health of others, we are, in proportion to our success, securing to the community a certain amount of additional capacity for work on the part of its constituent members, as well as increasing the individual capacity for happiness on the part of all the members whom our efforts may reach. Therefore I take it that if we regard this subject from an ethical point of view, it is clear that we have no duty to perform of a more grave and important kind than this—thoughtfully to study the conditions of health, earnestly to teach these conditions to others, and strenuously to make their observance a law to ourselves. Now of these conditions one of the most important is suitable recreation. For this is the condition which extends to all classes of the community, and the observance of which is, as we have seen, an imperative necessity to every individual who desires to possess a sound working mind in a sound working body. Hence, I do not hesitate to say that one of our most weighty duties in life is to ascertain the kinds and degrees of recreation which are most suitable to ourselves or to others, and then with all our hearts to utilize the one, while with all our powers we encourage the other. Be it remembered that by recreation I mean only that which with the least expenditure of time renders the exhausted energies most fitted to resume their work; and be it also remembered that recreation is necessary not only for maintaining our powers of work so far as these are dependent on our vitality, but also for maintaining our happiness so far as this is dependent on our health. Remembering these things, I entertain no fear of contradiction when I conclude that, whether we look to the community as a whole, or restrict our view to our own individual selves, we have no duty to discharge of a more high and serious kind than this—rationally to understand and properly to apply the principles of all that in the full but only legitimate sense of the word we call recreation. Again, therefore, I say, if we know these things, happy are we if we do them. And if we desire to do them—if as rational and moral creatures we desire to obey the most solemn injunction that ever fell from human lips, 'Work while it is day'—we must remember that the daylight of our life may be clouded by our folly or shortened by our sin; that the work which we may hope to do we shall be enabled to do only by hearkening to that Wisdom who holdeth in her right hand length of days, in her left hand riches and honour; and that at last, when all to us is dark with the darkness of an unknown night, such Wisdom will not have cried to us in vain if she has taught us how to sow most plenteously a harvest of good things that our children's children are to reap.

IX.

HYPNOTISM[1].

CONSIDERING the length of time that so-called 'animal magnetism,' 'mesmerism,' or 'electro-biology' has been before the world, it is a matter of surprise that so inviting a field of physiological inquiry should have been so long allowed to lie fallow. A few scientific men in France and Germany have indeed, from time to time, made some observations on what Preyer has called the 'kataplectic state' as artificially induced in human beings and sundry species of animals; but anything resembling a systematic investigation of the remarkable facts of mesmerism has not hitherto been attempted by any physiologist in our generation. The scientific world will therefore give a more than usually hearty welcome to a treatise which has just been published upon the subject by a man so eminent as Heidenhain. The research of which this treatise is the outcome is in every way worthy of its distinguished author; for it serves not only to present a considerable and systematic body of carefully observed facts, but also to lead the way for an indefinite amount of further inquiry along the lines that it has opened up.

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[1] *Der sogenannte thierische Magnetismus.* Physiologische Beobachtungen, von Dr. Rudolf Heidenhain, ord. Professor der Physiologie und Director des physiologischen Institutes zu Breslau. (Breitkopf und Härtel, Leipzig, 1880.)

Heidenhain conducted his investigations on medical men and students as his subjects, one of them being his brother. He found that in the first or least profound stage of hypnotism the patient, on being awakened, can remember all that happened during the state of mesmeric sleep; on awakening from the second or more profound stage, the patient can only partially recollect what has happened; while in the third, or most profound stage, all power of subsequent recollection is lost. But during even the most profound stage the power of sensory perception remains. The condition of the patient is then the same, so far as the reception of sensory impressions is concerned, as that of a man whose attention is absorbed or distracted; he sees sights, hears sounds, &c., without *knowing* that he sees or hears them, and he cannot afterwards recollect the impressions that were made. But the less profound stages of hypnotism are paralleled by those less profound conditions of reverie in which a passing sight or sound, although not noticed at the time, may be subsequently recalled by an effort of the will. Further on in his treatise Heidenhain tells us that, even when all memory of what has passed during the hypnotic state is absent on awakening, it may be aroused by giving the patient a clue, just as in the case of a forgotten dream. This clue may consist only of a single word in a sentence. Thus, for instance, if a line of poetry is read to a patient during his sleep, the whole line may sometimes be recalled to his memory, when awake, by repeating a single word of the line. Again, we know from daily experience that the most complicated neuro-muscular actions—such as those required for piano-playing—become by frequent repetition 'mechanical,' or performed without consciousness of the processes by which the result is achieved. So it is in the case of hypnotism. Actions which have been previously rendered mechanical by long habit are, in the state of hypnotism, performed automatically in response to their appropriate stimuli. There being a strong tendency to imitate movements, these appropriate stimuli may consist in the operator himself performing the movements. Thus, when Heidenhain held his fist before his hypnotized subject's face, his subject immediately imitated the movement; when he opened his hand, his subject did the same, provided that his hand was visible to his subject at the time. Also, when he clattered his teeth, the hypnotized patient repeated the movement, even though the patient could only hear, and not see, the movement; similarly, the patient would follow him about the room, provided that in walking he made sufficient noise to constitute a stimulus to automatic walking on the part of his patient. In order to constitute stimuli to such automatic movements, the sounds or gestures must stand in some such customary relation to the movements that the occurrence of the former naturally suggests the latter.

Another characteristic of the hypnotic state is that of an extraordinary exaltation of sensibility, so that stimuli of various kinds, though much too feeble to evoke any response in the ordinary condition of the nervous system, are effective as stimuli in the hypnotic condition. It is remarkable that this state of exalted sensibility should be accompanied by what appears to be a lowered, or even a dormant, state of consciousness. It is also remarkable that this exaltation of sensibility does not appear to take place with what may be called a proportional reference to all kinds of stimuli. Indeed, far from there being any such proportional reference, the greatly exalted state of sensibility towards slight stimuli is accompanied by a greatly diminished state of excitability towards strong stimuli. Thus, deeply hypnotized persons will allow themselves to be cut, or burnt, or to have pins stuck into their flesh, without showing the smallest signs of discomfort. Heidenhain is careful to point out the interesting similarity, if not identity, between this condition and that which sometimes occurs in certain pathological derangements of the central nervous system, as well as in a certain stage of anaesthesia, wherein the patient is able to feel the contact of the surgical instruments, while quite insensible to any pain produced by the cutting of his flesh. Reflex sensibility, or sensibility conducing to reflex movements, also undergoes a change, and it does so in the direction of increase, as might be expected from the consideration that with the temporary abolition of consciousness the inhibitory influence, which we know the higher nerve-centres to be capable of *exerting upon the lower, is presumably suspended.* But quite unanticipated is the remarkable fact that the state of exalted reflex excitability may persist for several days—perhaps for a week—after a man has been aroused from a state of profound hypnotism. Thus, Dr. Krener, after having been hypnotized by Professor Heidenhain, and while asleep made to bend his arm twice, for several days afterwards was unable again to straighten it, on account of the flexor muscles continuing in a state of tonic contraction, or cramp. In these experiments Heidenhain found that a very gentle stimulation of the skin caused only the muscles lying immediately below the seat of stimulation to contract, and that on progressively increasing the strength of the stimulus its effect progressively spread to muscles and to muscle-groups further and further removed from the seat of stimulation. It is interesting that this progressive spread of stimulation follows almost exactly Professor Pflüger's Law of Irradiation. But the rate at which a reflex excitation is propagated through the central nerve-organs is very slow, as compared with the rapidity with which such propagation takes place in ordinary circumstances. Moreover, the muscles are prone to go into tonic contraction, rather than to respond to a stimulus in the ordinary way. The whole hypnotic condition thus so strongly resembles that of catalepsy that Heidenhain regards the former as nothing other than the latter artificially induced. In the case of strong persons this tonic contraction of the muscles may make the body as stiff as a board, so that, if a man is supported in a horizontal position by his head and his feet only, one may stand upon his stomach without causing the body to yield. The rate of breathing has been seen by Heidenhain to be increased fourfold, and the pulse also to be accelerated, though not in so considerable a degree.

In a chapter on the conditions which induce the state of hypnotism, Heidenhain begins by dismissing all ideas of any special 'force' as required to produce or to explain any of the phenomena which he has witnessed. He does not doubt that some persons are more susceptible than others to the influences which induce the hypnotic state, and he thinks that this susceptibility is greatest in persons of high nervous sensibility. These 'influences' may be of various kinds—such as looking continuously at a small bright object, listening continuously to a monotonous sound, submitting to be gently and continuously stroked upon the skin, &c.—the common peculiarity of all the influences which may induce the hypnotic state being that they are sensory stimuli of a gentle, continuous, and monotonous kind. Awakening may be produced by suddenly blowing upon the face, slapping the hand, screaming in the ear, &c., and even by the change of stimulus proceeding from the retina which is caused by a person other than the operator suddenly taking his place before the patient. On the whole, the hypnotic condition may be induced in susceptible persons by a feeble, continued, and regular stimulation of the nerves of touch, sight, or hearing; and may be terminated by a strong or sudden change in the stimulation of these same nerves.

The physiological explanation of the hypnotic state which Heidenhain ventures to suggest is that a stimulus of the kind just mentioned has the effect of inhibiting the functions of the cerebral hemispheres, in a manner analogous to that which is known to occur in several other cases which he quotes of ganglionic action being inhibited by *certain kinds of stimuli operating upon their* sensory nerves.

In a more recent paper, embodying the results of a further investigation in which he was joined by P. Grutzner, Heidenhain gives us the following supplementary information.

The muscles which are earliest affected are those of the eyelids; the patient is unable to open his closed eyes by any effort of his will. Next, the affection extends in a similar manner to the muscles of the jaw, then to the arms, trunk, and legs. But, even when so many of the muscles of the body have passed beyond the control of the will, consciousness may remain intact. In other cases, however, the hypnotic sleep comes on earlier.

Imitative movements become more and more certain the more they are practised, so that at last they may be invariable and wonderfully precise, extending to the least striking or conspicuous of the changes of attitude and general movements of the operator. Professor Berger observed that when pressure is exerted with the hand at the nape of the neck upon the spinous process of the seventh cervical vertebra the patient will begin to imitate spoken words. It is immaterial whether or not the words make sense, or whether they belong to a known or to an unknown language. The tone in which the imitation is made varies greatly in different individuals, but for the same individual is always constant. In one case it was a hollow tone, 'like a voice from the grave'; in another almost a whisper, and so on. In all cases, however, the tone is continued in one kind, i. e. it is monotonous. Further experiments showed that pressure on the nape of the neck was not the only means whereby imitative speaking could be induced, but that the latter would follow with equal certainty and precision if the experimenter spoke against the nape of the neck—especially if he directed his words upon it by means of a sound-funnel. A similar result followed if the words were directed against the pit of the stomach. It followed with less certainty when the words were directed against the larynx or into the open mouth, and the patient remained quite dumb when the words were directed into his ear or upon any other part of his head. If a tuning-fork were substituted for the voice the note of the fork would be imitated by the patient when the end of the fork was placed on any of the situations just mentioned as sensitive. By exploring the pit of the stomach with a tuning-fork the sensitive area was found to begin about an inch below the breast-bone, and from thence to extend for about two inches downwards and about the same distance right and left from the middle line, while the navel, breast-bone, ribs, &c., were quite insensitive. Heidenhain seeks—though not, we think, successfully—to explain this curious distribution of areas sensitive to sound by considerations as to the distribution of the vagus nerve.

Next we have a chapter on the subjection of the intellectual faculties to the will of the operator which is manifested by persons when in a state of hypnotism. For the manifestation of these phenomena the sleep must be less profound than that which is required for producing imitative movements; in this stage of hypnotism the experimenter has not only the motor mechanism on which to operate, but likewise the imagination. 'Artificial hallucinations' may be produced to any extent by rehearsing to the patient the scenes or events which it may be desired to make him imagine. A number of interesting details of particular cases are given, but we have only space to repeat one of the most curious. A medical student, when hypnotized in the morning, had a long and consecutive dream, in which he imagined that he had gone to the Zoological Gardens, that a lion had broken loose, that he was greatly terrified, &c. On the evening of the same day he was again hypnotized, and again had exactly the same dream. Lastly, at night, while sleeping normally, the dream was a third time repeated.

A number of experiments proved that stimulation of certain parts of the skin of hypnotized persons is followed by certain reflex movements. For instance, when the skin of the neck between the fourth and seventh cervical vertebrae is gently stroked with the finger the patient emits a peculiar sighing sound. The similarity of these reflex movements to those which occur in the well-known 'croak-experiment' of Goltz is pointed out.

A number of other experiments proved that unilateral hypnotism might be induced by gently and repeatedly stroking one side or other of the head and forehead. The resulting hypnotism manifested itself on the side opposite to that which was stroked, and affected both the face and limbs. When the left side of the head was stroked there further resulted all the phenomena of aphasia, which was not the case when the right side of the head was stroked. When both sides of the head were stroked all the limbs were rendered cataleptic, but aphasia did not result. On placing the arms in Mosso's apparatus for measuring the volume of blood it was found that when one arm was hypnotized by the unilateral method its volume of blood was much diminished, while that of the other arm was increased, and that the balance was restored as soon as the cataleptic condition passed off. In these experiments consciousness remained unaffected, and there were no disagreeable sensations experienced by the patient. In some instances, however, the above results were equivocal, catalepsy occurring on the same side as the stroking, or sometimes on one side and sometimes on the other. In all cases of unilateral hypnotism, the side affected as to motion is also affected as to sensation. Sense of temperature under these circumstances remains intact long after sense of touch has been abolished. As regards special sensation, the eye on the hypnotized side is affected both as to its mechanism of accommodation and its sense of colour. While colour-blind to 'objective colours,' the hypnotized eye will see 'subjective colours' when it is gently pressed and the pressure suddenly removed. Moreover, if a dose of atropin be administered to it, and if it be then from time to time hypnotized while the drug is gradually developing its influence, the colour-sense will be found to be undergoing a gradual change. In the first stage yellow appears grey with a bluish tinge, in the second stage pure blue, in the third blue with a yellowish tinge, and in the fourth yellow with a light bluish tinge. The research concludes with some experiments which show that in partly hypnotized persons imitative movements take place involuntarily, and persist until interrupted by a direct effort of the will. From this fact Heidenhain infers that the imitative movements which occur in the more profound stages of hypnotism are purely automatic or involuntary.

In concluding this brief sketch of Heidenhain's interesting results, it is desirable to add that in most of them he has been anticipated by the experiments of Braid. Braid's book is now out of print, and as it is not once alluded to by Heidenhain we must fairly suppose that he has not read it. But we should be doing scant justice to this book if we said merely that it anticipated nearly all the observations above mentioned. It has done much more than this. In the vast number of careful experiments which it records—all undertaken and prosecuted in a manner strictly scientific—it carried the inquiry into various provinces which have not been entered by Heidenhain. Many of the facts which that inquiry yielded appear, *a priori*, to be almost incredible; but, as their painstaking investigator has had every one of his results confirmed by Heidenhain so far as the latter physiologist has prosecuted his researches, it is but fair to conclude that the hitherto unconfirmed observations deserve to be repeated. No one can read Braid's work without being impressed by *the care and candour with which, amid violent* opposition from all quarters, his investigations were pursued; and now, when, after a lapse of nearly forty years, his results are beginning to receive the confirmation which they deserve, the physiologists who yield it ought not to forget the credit that is due to the earliest, the most laborious, and the hitherto most extensive investigator of the phenomena of what he called Hypnotism.

X.

HYDROPHOBIA AND THE MUZZLING ORDER.

THE Muzzling Order has been rescinded for the metropolis, and once again we have the old round of jubilations, protests, leading articles in the daily papers, and a full-page picture in *Punch*. The general result is that, both as regards the formation of public opinion and any 'prevention of hydrophobia,' we are all very much as we were between four and five years ago, when the previous muzzling order was rescinded. Yet the questions in debate, in so far as they are real, are questions of fact; and, therefore, the prolonged nature of the debate can only be due to prejudice on one side or the other. Under these circumstances, I think it may be useful to show on which side of this debate the prejudice lies. Therefore, I will endeavour, as impartially as I can, to present all the arguments which have been brought forward on both sides.

First of all, it is desirable to distinguish between valid arguments and merely gratuitous statements. Thus, for example, we sometimes hear it denied that there is such a disease as hydrophobia, from which it easily follows that muzzling orders are absurd. Only this morning I have found it difficult to satisfy a highly trained classical man in Oxford that there is a difference between hydrophobia and tetanus, so firmly persuaded was he that deaths which are attributed to the former (imaginary) disease are really due to the latter. This man would take nothing upon medical authority touching the different symptoms of these two diseases, although he was quite prepared to accept the unsupported statements of laymen as to their pathological identity. Nor am I sure that I quite convinced him even by an offer to prove before his own eyes that, while a healthy dog, when bitten by what *I* should call a rabid dog, would die of what *he* might call tetanus, no healthy dog, when bitten by another which I should not call rabid, would so die.

Again, we often encounter the statement that, even if hydrophobia is a separate and distinct disease, it is a disease which may arise spontaneously, or without inoculation (by dog-bite, &c.), from an animal already afflicted with the disease; hence, it is argued, there is no use in attempting to 'stamp out' the disease by muzzling. Now, even if the premiss here were granted, it would not ground any valid conclusion against muzzling; for, although it might then be true that muzzling could not extirpate hydrophobia, it would still enormously diminish that disease. But, as a matter of fact, the premiss cannot be granted, because it is merely a gratuitous statement which, like the one previously mentioned, is not only destitute of evidence, but directly opposed to all the evidence that we possess. Of course, there are alleged cases of the spontaneous origin of rabies, especially in dogs; but not one of these cases constitutes what can properly be termed evidence. In order that there should be good evidence on such a point, there must first of all be demonstrative proof that the animal in question cannot possibly have been bitten by any rabid animal; and no such proof has hitherto been forthcoming. On the other hand, the large and general fact, that in no country or large district where rabies has never occurred (or, having occurred, has been completely extirpated) is it known to have spontaneously appeared (or arisen *de novo*[1]), constitutes the best evidence that can be logically required in proof of a negative reply. No doubt it is necessary to suppose that at some time, or times, and in some place, or places, rabies must have had an origin, which, therefore, must have been independent of previous inoculation; but this is no more than has to be supposed in the case of all other communicable diseases—infectious as well as contagious. And in all such cases the question of ultimate origin is distinct from that of spontaneous occurrence under existing conditions. We cannot, indeed, prove the abstract impossibility of a spontaneous occurrence of any communicable disease at any moment; but for all practical purposes it is enough to know that, if such and such a communicable disease ever does originate of itself, the fact at any rate must be one of extraordinarily rare occurrence.

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[1] 'The disease is absolutely unknown in Australia, New Zealand, and Tasmania, in the Azores, in Madeira, in St. Helena, and in Sumatra. It has occurred frequently in Egypt, and along the northern coast of Africa, but it has never crossed the deserts, and the other regions of this vast continent have hitherto enjoyed perfect immunity from this terrible scourge, although every village and settlement swarms with dogs. The immunity of Cape Colony has been so perfect as to give rise to the idea that some climatic influence operates there, and that a rabid dog has only to "sniff the air" of the colony to be cured.'—('Hydrophobia: its Cause, and Prevention by Muzzling,' an excellent pamphlet recently published by Mr. Kerslake, hon., sec. to the Society for the Prevention of Hydrophobia, 50 Leicester Square.)

So much, then, for merely gratuitous statements, whether without or against evidence. They must be ignored *in limine*. And I think the same ought to be said of all expressions of feeling or sentiment, where these are recognized, by the general common sense—or the general *moral* sense—of the public, to be manifestly improper. Thus, for example, when anybody tells us that, as a matter of feeling, it is desirable to allow a score or two of men, women, and children to perish annually from hydrophobia, rather than to inflict the 'torture' of muzzling on some hundred thousand dogs, I hold that such an expression of opinion is as unworthy of notice as it is unworthy of the human being who propounds it —and this whether or not that human being happens to know what death by hydrophobia means.

Passing over, then, all merely irrational statements of fact and immoral expressions of opinion, let us proceed to consider the *pros* and *cons* of the muzzling question in as exhaustive and business-like a way as the question deserves, if we attach any importance to the formation of our own opinion upon it.

Perhaps it is desirable to observe at the commencement that, in order to leave space for a full consideration of the prevention of hydrophobia, I shall abstain from anywhere alluding to the manner of its cure. We have all heard so much about M Pasteur's work in the latter direction that a paper on hydrophobia may well seem incomplete if it does not deal with this side of the subject. But, in the first place, were I to discuss M. Pasteur's methods and results, I should desire to do so thoroughly, and this would require a separate article. In the second place, the muzzling question is obviously quite distinct from that as to the success which has attended the great pathologist's investigations. In the third place, whether or not the measure of his success has been all that his supporters claim for it, Englishmen have always been accustomed to remark that 'prevention is better than cure'—and, by a curious irony of the time, it is just those Englishmen who most believe in the efficacy of the Frenchman's cure that are now most loudly advocating the desirability of prevention. Which things are a parable. For, beforehand, one might have supposed it would always be the case that the less a man believes in the possibility of a cure the more would he be anxious to further the methods of prevention.

And when we find such is not the case we may generally further find the reason to lie among those strange contradictions of human nature which arise where the balance between thought and feeling has never been properly adjusted.

There are only three possible ways of preventing hydrophobia—namely, either by exterminating, by protectively inoculating, or by muzzling all the dogs in districts where hydrophobia occurs. Any of these methods, if followed with sufficient rigour, would be equally effective. For obvious reasons, however, the latter method is preferable to either of the others. Moreover, it is no less obvious that the muzzling need not be continued indefinitely. It only requires to be continued long enough to ensure that all dogs which have already been bitten by rabid dogs shall have passed through the latent stage of the disease. This period having elapsed, the muzzling may be withdrawn; for the disease in that district will have been stamped out. Again, seeing that our own country is an island, it is abundantly practicable to extirpate the disease altogether, by muzzling dogs for a few months throughout the island, and then placing all imported dogs in quarantine for a similar period.

The arguments in favour of muzzling are so obvious that I may almost apologize for mentioning them. Unless it is disputed that hydrophobia is a disease which had best be got rid of, the fact that adequate muzzling is a practicable as well as a certain means of stamping out the disease is in itself a sufficient argument. Moreover, the fact that, as I shall presently show, muzzling is the *only* means to this end which is at once practicable and certain converts the sufficient argument into a superabundant one.

The arguments on the other side are:—(1) an attempted disproof of the statement which I have just made—namely, that muzzling is a certain means of stamping out the disease; (2) that, even if muzzling were a sufficient means to this end in districts where it is applied, it ought to be applied in all parts of the kingdom simultaneously; (3) that there is no use in muzzling dogs alone, unless we likewise muzzle cats, foxes, and so forth, which is impracticable; (4) that a system of police registration of dogs is as effectual as the system of muzzling; and (5) that the muzzling system is a cruel system.

Taking, then, these several arguments in the order just set forth, the first of them admits of being annihilated both on *a priori* and *a posteriori* grounds. On *a priori* grounds, because, as it has now been proved that hydrophobia is a zymotic disease, and therefore a disease which does not arise spontaneously, it stands to reason that adequate muzzling of dogs *must* have the effect of preventing the spread of the disease, so far as dogs are concerned. The only question that can here arise is as to the possibility of sufficiently well muzzling dogs to prevent them from biting. But it has been well proved that dogs cannot bite through a particular kind of muzzle, which, as I shall presently explain, happens also to be the kind of muzzle that is of least inconvenience to the dogs themselves. Hence, the present argument against muzzling may be regarded as sufficiently met on *a priori* grounds alone. But the case becomes simply overwhelming when we turn to the *a posteriori* grounds. These are grounds of statistics, as follows:—

Berlin.—(I here quote from the Report of the Royal Commission on Rabies in Dogs, 1887):—

> In the city of Berlin special regulations are in force. In consequence of a severe outbreak in the year 1852, during which 107 dogs were destroyed as rabid, the Royal Police issued a decree to the effect, on July 2, 1853, that all dogs should be provided with a wire muzzle positively preventing the animal from biting, and to empower special persons appointed by the police for that purpose to seize and destroy all dogs not so muzzled; and, when the owner could be found, imposing a fine of ten thalers (£1 10*s.*) or a term of imprisonment. In the year following this decree only one dog was killed as rabid, against ninety-seven in the previous year. The decree still remains in force, but does not seem to have been effectual in preventing the recurrence of epidemics of rabies; for the number of dogs killed as rabid, which up to 1863 had not exceeded in any year nine, rose progressively in the succeeding years, till in 1868 the number had reached sixty-six, declining again to seven in 1870, only to increase in 1872 to sixty-nine. In 1875 a law was passed, extending to the whole of Prussia, for the suppression and prevention of animal disease,

which provides that all dogs suspected of rabies shall be immediately killed, as also all animals which it is evident have been bitten by rabid animals; and that all dogs in a district which has been infected by an outbreak of rabies shall be confined, or, when abroad, both muzzled and led. The technical section of the Veterinary Board in Berlin are of opinion that the passing of this law, and not only the existence of the muzzling order in that city, is the cause of the extinction of rabies in Berlin; no case has occurred there since 1883.

Some words of comment on this paragraph of the report are desirable. It is quite true that in the year following the muzzling decree in Berlin the number of rabid dogs killed fell from ninety-seven to one. But to this it ought to be added that, if we look to the full statistics themselves, as supplied to the British Government by Prince Bismarck, we find that they began in 1846, or eight years before the muzzling order was made. Now, by quoting these years in parallel columns, we obtain the following results:—

Rabid dogs killed during eight years before muzzling.		Rabid dogs killed during eight years after muzzling.	
1846	29	1854	1
1847	3	1855	3
1848	13	1856	0
1849	24	1857	3
1850	23	1858	0
1851	34	1859	2
1852	107	1860	0
1853	97	1861	5
		1862	1
Total	330	Total	15

This great difference seems enough to prove the high efficiency of muzzling. Nevertheless, during the next eleven years, as the report of the Royal Commission points out, there were great fluctuations in the numbers of rabid dogs—the lowest number being seven in 1870–1, and the highest sixty-nine in 1872–3. These fluctuations, it seems to me, can only be explained by supposing them to have been determined by the number of rabid dogs that happened in different years to invade the city from without; because, no sooner had the muzzling order been extended to the surrounding country, together with provisions which, among other things, stringently excluded importation of rabid dogs from other countries (such as Russia, where rabies is rife), than the disease in Berlin was reduced to a rapidly vanishing quantity, and has entirely disappeared since 1883.

Vienna.—Rabies was extirpated in this city by eighteen months of stringent muzzling. Then, in the summer of 1886, the muzzling order was withdrawn, and a system of placing badges on registered dogs was substituted. During the next half-year only one case of rabies occurred. This, of course, is what might have been expected, looking to the incubation period of the disease. But in another half-year an epidemic of rabies occurred, the muzzling order was renewed, and the disease again disappeared. This order is still stringently in force.

Holland.—Here rabies had become very formidable in the years preceding 1875. In June of that year a muzzling order was issued. In the autumn of the same year the cases fell to forty-one, and during the *whole* of the following year they were but fifty-five. In the year after that they fell to fourteen; in the next year to four, and in the next (1879) to three. In 1880 the numbers again rose to thirteen; but, as in the previous four years, the cases occurred only on or near the frontier of Belgium, in which country the dogs were unmuzzled.

Sweden.—The statistics furnished by Professor Lindqvist in reply to Mr. Kerslake show that formerly a yearly average of eight to ten deaths from hydrophobia occurred in Sweden; but that, in consequence of muzzling, combined with a law prohibiting the importation of dogs, there have not been any deaths since 1870.

London.—In 1884 hydrophobia increased to an alarming extent. Nothing, however, was done in the way of prevention; and in the following year (1885) it increased still more, twenty-seven deaths being recorded. *A muzzling order was then issued*, and by the end of the next year (1886) no single death was recorded. The muzzling order was then rescinded. A few months afterwards hydrophobia appeared in South London, and then the deaths gradually rose from year to year, till in 1889 there were ten deaths recorded. The muzzling order was therefore renewed in July 1889, and since October 1889 no death has been recorded[1].

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[1] In England (including Wales) there have been 939 deaths from hydrophobia recorded during the past thirty-eight years, the yearly

Now, it seems to me that these statistics, which have been taken from *all* countries where muzzling orders have hitherto been tried, constitute a conclusive answer to what has been said about the uselessness of the method. No statistics could possibly show a closer connexion between cause and effect; neither could they well show any higher degree of efficiency on the part of the cause. Therefore we may dismiss the argument, or, rather, the unfounded and fully contradicted statement, that muzzling is ineffectual.

The *second argument* to be dealt with is that, even if muzzling be effectual, to be fully effectual it ought to be applied throughout the United Kingdom. Well, in the first place, this argument is incompatible with the one which we have just been considering. If muzzling be objected to on the ground that it is ineffectual, it does not lie with those who so object to object also on the ground that muzzling orders are not sufficiently extensive. In the second place, any one who does *not* object to *muzzling* as an efficient preventive method, but only to the muzzling *orders* as not sufficiently general, is raising a distinct question, and, as this question has reference to the desirability of ex-

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average for the first sixteen years being 8, for the next sixteen years 15, *and for the remaining period, ending in 1885*, 45. Thus, the mortality has steadily advanced through more than 400 per cent. On the other hand, the Prussian preventive measures have reduced deaths from hydrophobia to a remarkable degree; for, while in the decade ending in 1819 there was a yearly average of 166 deaths, in a similar period, ending in 1886, there was a yearly average of 4½.

tending instead of abolishing these orders, I shall consider it later on.

The next argument we have to deal with is akin to the one which we have just considered. For it represents the uselessness of muzzling dogs, even in affected districts, unless at the same time we muzzle cats. The answer is twofold. In the first place, it is better to have half a loaf than no bread; it is no argument against muzzling dogs that some small percentage of rabies may be kept going by cats. But, in the second place, the percentage of rabies that could be kept going by cats alone would be infinitesimal. For, unlike dogs, cats when rabid do not run the streets. On the contrary, they hide themselves, and die in seclusion. The case of wild foxes is too absurd to require serious notice; and perhaps the whole objection which we are now considering may best be met by pointing to the cases of Berlin, Vienna, and London, as well as the whole of Sweden, where, as we have just seen, hydrophobia *has* been exterminated by muzzling dogs alone, notwithstanding the presence of cats.

Similarly, the next argument on our list admits of being negatived, not only on grounds of common sense, but also by pointing to the case of Vienna. The argument is, that a system of police registration of dogs would be as effectual as muzzling; the answer is, that the experiment has already been tried in Vienna, with such bad results that muzzling orders had to be renewed in a few months. Moreover, the same thing has occurred both in Belgium and in our own town of Bradford.

Lastly, there is the argument as to the cruelty of muzzling dogs. This argument, however, admits of many answers. First of all, even if it were true that dogs must suffer from their muzzles, it is sheer nonsense to designate as *cruelty* the infliction of such an amount of inconvenience or discomfort as they may thus be required to experience. The muzzling need only last for a period measured by months, and if the muzzles be wire cages (which are in all ways better than straps) the dog can breathe and pant and drink just as well with as without his muzzle. Therefore it does not appear that he is any more inconvenienced by his muzzle than is a horse by his harness or by his bit. No doubt, when first put on, many dogs show themselves intolerant of its presence; but so at first does a horse of the presence of his harness. In both cases, however, the intolerance is due merely to inexperience, and quickly gives way to habit. So that, really, it seems to me sentimentalism in its most extravagant form which, when so awful a disease as hydrophobia is in question, can seriously talk about the cruelty of exposing 'the friend of man' to the inconvenience of wearing a cage muzzle for a few months. Even if we have more regard to the friend of man than we have to man himself—as is confessedly the case with not a few writers upon such subjects—still, from the point of view of our friend's interest alone, it is surely better for him that he should fret and rub his nose for a week or two when out of doors, and before he becomes accustomed to his muzzle, than that he should be liable to death by rabies.

It appears, then, that there is no valid argument against the muzzling method; and therefore we may well wonder why it creates so much impassioned opposition. Yet the reason is not far to seek. Just because the opposition is impassioned, it is irrational.

Does it seem that a finding conveyed in such words as these belies the profession of impartiality with which I started? If so, I must ask for a definition of impartiality. For by this term I do not mean to indicate any insincere pretence of entertaining arguments *per contra* where there are no such arguments to entertain. I should not accuse any scientific man of not being impartial, were he to employ similarly strong language against the still surviving opinion as to the flatness of the globe. His impartiality would be shown rather in the patience with which he first states all the arguments which have been adduced in favour of such an opinion; and, having proved them worthless, he would not forgo his impartiality of mind by afterwards characterizing that opinion as maintainable only by ignorance or fanaticism. And so in the present case. I have stated and considered the arguments which have been alleged in favour of the view that muzzling orders are useless for the prevention of hydrophobia, or in sundry other respects undesirable measures of administration. If all these arguments are found to be worthless, the fault does not lie with me. Nor can I be accused of partiality merely because I state the result of such an inquiry in the language of suitable emphasis. But lest it should be thought that these words are needlessly hard—that one ought not to make such wholesale accusations of ignorance and fanaticism against large and organized bodies of one's countrymen—I will justify what I have said by quoting from avowedly representative witnesses before the Royal Commission on Rabies. The material is abundant, but I will occupy space with only two or three samples.

What, then, is the value of a man's judgement who gave it as his opinion that hydrophobia 'is a condition arising in the course of any disease'; that, although it may follow from the bite of a dog, it may also follow from any other injury, 'the scratch of a nail, for instance,' or 'if you broke your leg'? Take again the downright absurdity of another witness who, while allowing that he had never himself performed an experiment, or seen an experiment performed, in answer to the question, 'I understand you to say that you have only lately seen the evidence with regard to M. Pasteur's system,' replied, 'I had the *Daily News* articles, and other articles, sent down to me at Hastings, and I looked through them as I was coming up in the train.' Or see, once more, the knowledge and the wisdom that are betokened in yet another witness by the following dialogue. After having hopelessly entangled himself on the subject of 'germs,' he was asked by the Chairman whether they were to take this as a fair summary of his opinion.

Q.—Your idea of the growth of the disease is that it develops from a germ coming from nobody knows where, but existing in somebody from some cause of which you know nothing?

A.—Yes.

Q.—Is it not also communicated by inoculation from a bite, or in any other way?

A.—It arises in both ways; both by inoculation from a mad dog, and naturally.

Q.—I do not quite understand what you mean by coming naturally; it must come from somewhere?

A.—Take the case of a person who goes mad; that person need not have been bitten by a mad person, but a mad germ is in that mad person's brain, and it *only* wants to be developed. The person might be perfectly quiet with the mad germ in his system, and might never be anything but an imbecile or a person of unsound mind, if he is properly cared for. But irritate that person, or trouble him, and at once the maniacal germ becomes developed, and he becomes raving mad. So I maintain in the case of the dog, there is a germ in the blood; it may be hereditary, it may be from a dog which has had rabies before, and has transmitted it; but I say that the germ would remain dormant for a time until something sets it in motion.

Q.—What do you understand by a 'germ'?

A.—An organic microbe organism, just the same as the anemone sea fish; it is something, and it is nothing; you can hardly define what it is; the lowest form of organic life; it is something in the blood which is almost indefinable, but which, if put under the microscope, is to be seen in a very minute form.

Is not this enough? Yet it is but a sample of the kind of witnesses put forward by the anti-scientific organizations of this country, for the purpose of rebutting evidence of a demonstrative character from the highest living authorities upon physiology and pathology. It is well that such witnesses have appeared. Out of their own mouths may they now be judged; and in that judgement the societies which put them forward as spokesmen are irretrievably condemned.

We may conclude, then, that there is no case against the muzzling of dogs for the purpose of preventing hydrophobia. But, although the main question is no longer an open question, there remains a subordinate question touching the best method of applying orders for the muzzling of dogs. And this subordinate question is one that does present considerable difficulty, as I will next proceed to show.

The question is as to whether muzzling orders should be made general for a period long enough to 'stamp out hydrophobia once for all,' as far as Great Britain is concerned; or whether the plan hitherto adopted by our Government should be *continued*—namely, applying orders for stated periods to infected districts only. This question may best be introduced by quoting the following correspondence which has recently been published:—

HIGHFIELD HOUSE,
CATFORD BRIDGE,
KENT, S.E.,
January 6.

DEAR MR. CHAPLIN,—In view of the relaxation of the muzzling order within the metropolitan area, I think it may be gratifying to you to know that during the past year not a single application has been made to the committee, which was formed when I was at the Mansion House, for sending *poor persons* bitten by mad dogs to the Pasteur Institute for treatment.

In the previous twelve months, 35 *patients*, who had undoubtedly been bitten by dogs suffering from rabies, were despatched to that establishment through and at the expense of my committee, not one of whom, I am happy to say, died.

It would appear that the result of the muzzling order, so far as the area over which I had a special purview is concerned, has been eminently efficacious; and it may be worth while to consider whether a general order of the same kind should not, at a favourable opportunity, be put in force for a moderate period, in the hope that hydrophobia might be stamped out once for all.

I remain, dear Mr. Chaplin,
Yours faithfully,
JAMES WHITEHEAD.

The Right Hon. Henry Chaplin, M.P.,
President of the Board of Agriculture.

January 13.

DEAR SIR JAMES,—I have to thank you for your courteous letter, which affords such encouraging testimony to the effects of the muzzling order in the metropolis; and it may interest you to learn from our returns what has been the effect of that order generally throughout the country, as well as in the metropolis.

I find that in 1889 there were reported 339 cases of rabies as having occurred throughout England, including the metropolis.

In 1890, under the influence of the muzzling regulation, the number of cases had been reduced to 139.

During the last six months of 1889, we had reported to us 133 cases, and 80 cases for the third and fourth quarters of that year respectively, 30 of which occurred in the metropolis.

During the same period in 1890 we have had 46 cases for the third, and only 11 for the fourth quarter, none of these cases having occurred in the metropolis.

These results, I think, are eminently satisfactory, and they encourage the belief that the plan adopted by the Board of scheduling certain counties, or groups of counties where the disease prevailed, and applying the order within their boundaries, would ultimately be successful in reducing the disease to a *minimum*, without making the order universal; and, consequently, with the smallest amount of annoyance to that section of the community who so warmly resent any interference with the ease and comfort of their dogs.

Whether I am right or wrong in this opinion remains to be proved, but I own I am not unsanguine as to the ultimate result, and I am averse, at all events at present, to adopting your suggestion and passing an order which should be general for a time.

Independently of other objections to that course, which I think will be obvious, I may be permitted to point out that a general muzzling order would be inefficient in itself 'to stamp out hydrophobia once for all,' unless it were accompanied by a measure prohibiting the importation of all dogs whatever into Great Britain. We shall always be liable to its return from the Continent, or from Ireland, where, according to the returns issued by the Irish Veterinary Department, it extensively prevails, and where the Board of Agriculture have no jurisdiction.

Believe me, yours very truly,
HENRY CHAPLIN.

Sir James Whitehead, Bart.

Such being the question now before us, I will briefly state what appear to me the valid arguments on both sides of it, taking first those in favour of Mr. Chaplin's policy.

It is an unquestionable fact that rabies has its centres chiefly in towns; and wherever it occurs in a town it is sure very soon to be brought to the notice of the police, when, of course, a muzzling order will be immediately issued. Therefore, what would be the use of harassing all the towns—and, *a fortiori*, all the country—with a general or indiscriminate order? If rabies were exterminated in all towns, or other districts at present affected thereby, the chances against its spread would be so enormously reduced that it would become an easy matter to stamp it out of the country altogether, by specially dealing with any other towns or country areas where any case might subsequently be observed. Our country, being an island, has comparatively little to fear in the way of contagion from without. So little, indeed, in the opinion of Mr. Chaplin, that he repudiates the suggestion of quarantine, and even uses as an argument against universal muzzling the fact that an unpopular measure in the way of quarantine would be a necessary part of such a policy. Furthermore, as the *Field* has recently observed, 'it would be a matter of extreme, nay, of almost insuperable, difficulty, for the authorities to see that each and every individual dog is properly muzzled,' while 'in the house and in the grounds, or within the curtilage, the dog would be without its muzzle, and here lurks danger again.' Lastly, 'hundreds of people there would be to do their best in avoiding and shirking the confinement of the mouths of their dogs'; so that, looking also to 'far remote country districts where collies or other varieties of their race may be at large,' probably 'it would take many months to bring such an Act of Parliament as would be required for the purpose of a general muzzling into proper working order.' (Jan. 17, 1891.)

This, as far as I know, exhausts the arguments which have been advanced against a general muzzling order. Taking next the arguments in favour of such an order, it may be urged that all the class of considerations adduced by the *Field* are considerations which prove too much. For, if 'danger lurks' in such cases as are mentioned, there is surely all the more need to legislate with reference to them. And, even if it should prove that legislation cannot cope with them adequately, at all events it would do so partially; and, as previously remarked, it is better to have half a loaf than no bread. Besides, the 'danger' attaching to such cases is somewhat exaggerated by the *Field*. 'In the house and in the grounds' there would be but comparatively few other dogs to bite; and if a rabid dog escaped from the house or grounds the fact of its being without a muzzle would act both as a warning and as a reason for its capture or destruction. Again, 'in the curtilage' the first symptoms of rabies would be detected by the hound-master—or, if not, would soon become unmistakable in some members of the pack, when common prudence would dictate measures of careful isolation. Again, although there might be much evasion of the law, this is more or less the case with every law; but surely in no case does it constitute any valid reason for not passing a law. Lastly, with regard to 'far remote country districts,' these are just the districts where dogs are least numerous, and therefore least likely to contract hydrophobia, or to spread it widely if they do. And to all this it should be added that the *Field* itself does not appear to attach much weight to its own 'difficulties'; for it concludes by saying that, notwithstanding these difficulties, 'the order will have to be general to be effective, and in these columns we have repeatedly advocated a general muzzling order.'

Touching the argument that rabies has its centres in towns, that it is needless to harass large country districts where no rabies has occurred for many years—such, for instance, as the whole of Scotland—it may be answered that in these days of rapid locomotion local muzzling can never make secure against the inoculation of an unaffected district, however large; and, therefore, that it would be better for all the country to suffer a common inconvenience for an equal time, rather than that our efforts to extirpate hydrophobia should prove abortive.

Again, with reference to quarantine, it is of course self-evident that this would require to be perpetual; but surely (our present advocate may say) it is only the eyes of a Minister which can perceive any argument against a general muzzling order on this score. Howsoever unpopular a perpetual quarantine on imported dogs might prove to be among one section of the community, this ought not to constitute any valid reason against so salutary a measure. Moreover, even from the point of view of political expediency, is it so certain that such a standing safeguard would be, in any large degree, unpopular? Certainly it would receive the warm support of all that portion of the public which desires the extirpation of hydrophobia; and that this is the largest section appears to be indicated by the public press[1]. Besides, if once a general muzzling order had been in force for a year or so, there can be no question that hydrophobia would have become so greatly reduced throughout the country (as it has just been thus reduced, not to say abolished, in the case of London) that public opinion would grow almost unanimous in favour of permanent quarantine. The mere relief of anxiety after dog-bite is—as may be seen in Scotland—so great a gain that the public as a whole would willingly suffer the small inconvenience imposed by quarantine to achieve this gain alone.

Thus, upon the whole, an advocate of general muzzling for a year or eighteen months may claim to have made good the position that, if such a measure holds out any reasonable prospect of extirpating hydrophobia, the experiment is a better one to try than is the experiment which Mr. Chaplin is now engaged in trying. For, in the first place, it is certain that Mr. Chaplin's experiment can only continue to be tried at the cost of not a few human lives, as well as of much suffering from anxiety after dog-bite, both on the part of individuals personally concerned and on that of their friends. In the second place, it is equally certain that, in the case of many districts where hydrophobia has been extirpated by local muzzling, it will reappear, and thus necessitate, for that district, a repetition of the muzzling nuisance. This consideration applies with special force to the particular case of the metropolis. Surrounded as it is by a dense canine population, it can only be a question of time, after every abolition of the disease by muzzling, and consequent repeal of the muzzling order, that the town will again be invaded by hydrophobia from the country, as it was in 1887. Thus, it is practically certain that, under Mr. Chaplin's present policy, London will be exposed to an indefinite repetition of muzzling orders, alternating with periods of hydrophobia.

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[1] As far as I know, the only paper of much influence which is opposed to the muzzling orders is the *Standard*, and that its opposition is due to some individual opinion appears to be indicated by the fact that it has systematically suppressed all communications addressed to it by the Society for the Prevention of Hydrophobia, in reply to what it has published on the opposite side. But, be this as it may, as against the *Standard* there may be placed the *Times*, the *Telegraph*, the *Morning Post*, the *Daily News*, the *Daily Chronicle*, *Punch*, the *Lancet*, the *British Medical Journal*, the *Hospital*, the *Field*, the *Saturday Review*, the *Globe*, the *World*, *Truth*, the *Sunday Times*, the *Stock-keeper*, the *Fancier's Gazette*, and many others.

Now, if this much be allowed, our advocate may continue, I will conclude by adducing the strongest of all my arguments. Mr. Chaplin's experiment is confessedly tentative. My experiment, on the other hand, would not be tentative. It has already been tried, and proved to be successful. For, in reply to a letter of inquiry from Mr. Kerslake, the British Consul at Stockholm has given us the history of the extirpation of hydrophobia in Sweden. And this history is most instructive. Many years ago the disease was formidable; but 'it was put an end to by muzzling all the dogs in the kingdom'; while, 'as to foreign dogs, or dogs imported, the Swedish law is very strict and effectual.' This law is, that no dogs of any kind are allowed to be imported, either by land or by sea. The result of these enactments is, 'that hydrophobia is now quite stamped out in Sweden, as there has been no case for many years.'

Here, then, is definite proof that the extirpation of hydrophobia is possible by means of a general muzzling order, followed by a perpetual law of quarantine. For, although the Swedish Government has seen fit to prevent the importation of dogs altogether, such a provision is needlessly severe. In all other countries where there is no hydrophobia, and where a perpetual law of quarantine has been established, the latter has been found fully effectual—as, for instance, in Australia and New Zealand. The example of Sweden, therefore, may be quoted as a complete answer to all the alleged 'difficulties' of rendering a muzzling order effective, and reduces the issue to a mere question of political expediency.

Such, then, is the pleading on both sides, presented as fully and as fairly as my reading on the subject has rendered this possible. Nor do I see that any advantage would be gained were I now to assume the function of a judge by summing up. But this much I may say as an expression of my own opinion. As long as the policy of local muzzling orders is continued, I cannot see that there is so much as the semblance of a reason for the recent abolition of the order as regards the metropolis. Or, in other words, it appears to me, for the reasons above stated, that a perpetual muzzling order for the metropolis is nothing short of a logical corollary upon local muzzling orders elsewhere.

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